minisono

USER MANUAL

minisono L3-12/C1-6

Rev. 7 (ENG)

ALPINION
MEDICAL SYSTEMS
www.alpinion.com

PN: 70004931

Copyright and License

Prepared by:
ALPINION MEDICAL SYSTEMS Co., LTD.
4F, 15, Magokjungang 14-ro,
Gangseo-gu, Seoul, 07789, Republic of Korea

T: +82 2 3777 8500 F: +82 2 3777 8691 www.alpinion.com

CE 2460

Revision Log

The following is a list of major changes and additions that have been made to this user manual since it was first released.

Rev	Date (YYYY/MM/DD)	Description
Rev. 0	2018/02/28	User manual first released
Rev. 1	2019/01/08	Updated for Rev. 1 release
Rev. 2	2019/04/04	Updated for Rev. 2 release
Rev. 3	2019/05/23	Updated for Rev. 3 release
Rev. 4	2019/11/01	Updated for Rev. 4 release
Rev. 5	2020/04/07	Updated for Rev. 5 release
Rev. 6	2020/07/03	Updated for Rev. 6 release
Rev. 7	2022/12/14	Updated for Rev. 7 release

Table of Contents

1

System Basics

This chapter introduces the followings:

Introduction

Documentation

CAUTION

Safety instructions must be reviewed before operating the unit.

The minisono manual is written for users who are familiar with basic ultrasound principles and techniques. It does not include sonographic training or detailed clinical procedures.

NOTE

The screen images in this manual are only for illustrational purposes. Actual screen display may differ slightly from that shown in this manual.

User Information Conventions

The minisono manual uses the following typographical conventions to assist you in finding and understanding information:

- Control names are spelled as they are on the system, and they appear in bold text.
- Menu titles are spelled as they are on the system, and they appear in bold text.
- All procedures are numbered, and all subprocedures are lettered. You must complete steps in the sequence they are presented to ensure success.
- Bulleted lists indicate general information about a particular function or procedure. They do not imply a sequential procedure.
- Symbols appear as they appear on the system.

The following gestures are used to control your system.

Table 1-1 Touch gestures

Gesture	Description
Drag	Touch the screen with a finger and move the finger across the screen without lifting the finger.
Swipe	Move your finger quickly across the screen.
Tap	Touch a control with your finger.
Pinch	Touch the screen with two fingers and move them toward each other.
Spread	Touch the screen with two fingers and move them apart.

Contraindication

Do not operate the system for an ophthalmic purpose or any use affecting the patient’s eye by the acoustic beam.

Prescription Device

United States law restricts this device to sale or use by, or on the order of a physician.

Intended Operator Profile

The minisono is intended for use by a qualified and trained physician or sonographer with at least basic ultrasound knowledge for ultrasound evaluation.

The operator must have read and understood the user manual.

Patient Data Protection

The minisono app does not encrypt patient data. It is the user's responsibility to configure the device to meet your local security policies and regulatory requirements.

ALPINION MEDICAL SYSTEMS recommends that you protect patient data by encrypting the device and setting a password as a screen lock for your device according to your organization's security policies and requirements.

System Feature

Table 1-2 System feature

Device/Model Name	• Device Name: minisono Ultrasound Imaging System • Model Name: minisono L3-12, minisono C1-6	
Physical Dimensions	minisono L3-12	• Height: 25.5 mm • Width: 62.5 mm • Depth: 150 mm • Weight: 175 g
	minisono C1-6	• Height: 25.5 mm • Width: 62.5 mm • Depth: 157 mm • Weight: 180 g
Clinical Applications	minisono L3-12	• Vascular • Small Parts • MSK • Anesthesia • FAST
	minisono C1-6	• Abdomen • Spine • FAST
Available Imaging Modes	• 2D mode • Harmonic mode (HAR) • M mode • Color Flow Doppler (CF) mode • Power Doppler (PD) mode • Pulsed Wave Doppler (PWD) mode	
Image Processing Technology	• Xpeed™ • Spatial Compounding Image (SCI) • Filter method Tissue Harmonic Image (FTHI) • Raw Data Processing • Post Processing	
Operable Transducers	Linear Array	• minisono L3-12
	Convex Array	• minisono C1-6

Measurement Package	Including reports for: • Abdomen • OB • GYN • Vascular • Urology • Pediatrics • Small Parts • MSK	
Available Measurements	2D Mode	• Distance, Ellipse, Trace • %Stenosis • Volume
	M Mode	• Distance • Time • %Stenosis
	Doppler Mode	• Velocity • Time
Connectivity	• Verification • DICOM storage • DICOM print • DICOM storage commitment • DICOM worklist • Network Storage	
User Interface	• English	

Package Contents

The minisono has the following items in the package.

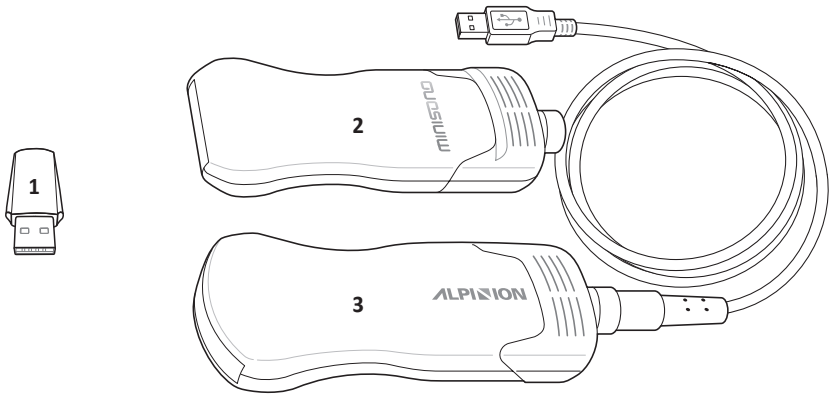


Figure 1-1 Package contents

1	Installation USB flash drive	**3**	Transducer (Convex type)
2	Transducer (Linear type)		

Peripherals and Accessories

Before using the peripherals or accessories, you should consider the following requirements.

WARNING

Observe all warnings and cautions given in the documentation of peripheral device.

CAUTION

For compatibility reasons, use only ALPINION approved peripherals or accessories. DO NOT connect any peripherals or accessories without approval by ALPINION.

Peripherals and Accessories

The minisono is designed to support a variety of peripherals and accessories.

Accessory
• Carrying case

Device Requirements

WARNING

Using the minisono software on a device that does not meet the minimum specification may result in poor image quality, unexpected results, and possible misdiagnosis.

For a list of devices that Alpinion Medical Systems has tested and determined to be compatible with the minisono software, please contact your local agent.

The recommended minimum device specifications are as follows:

- Minimum 50 MB of storage space (plus more for patient data storage)
- Color display, minimum 12.3 inch
- Touch interface
- Internally mounted speakers
- IEC 60601-1 certified or IEC 60950-1 compliant
- Date/time configuration
- Full compliance with USB On-The-Go standard
- 1920 x 1080 resolution (minimum)
- Operating System (OS): Windows 10 Pro or Widows 10 Iot
- Window 10 Pro OS version: 1903 or higher
- Wireless networking capability
- Access to ports 80 and 443

Image Display

The image display consists of an ultrasound image, application information, patient information, and indicators.

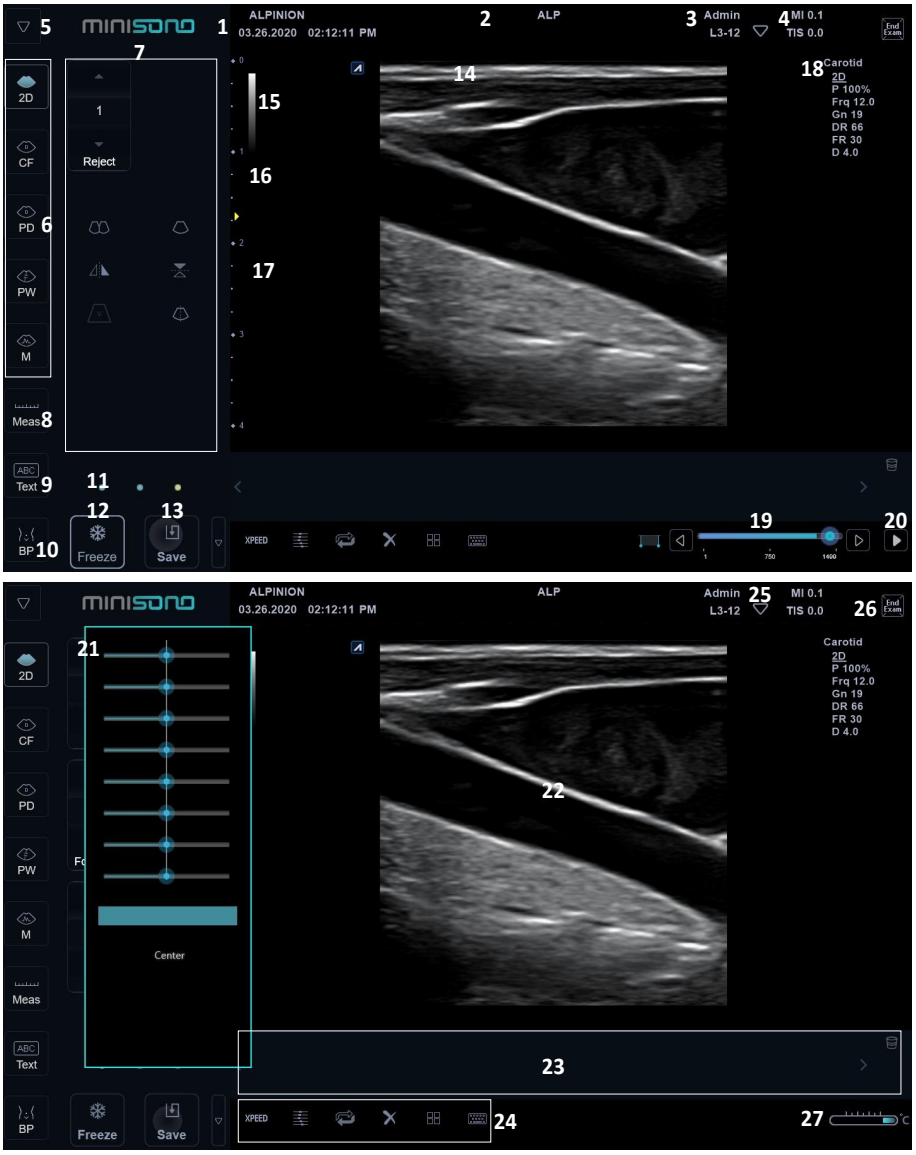


Figure 1-2 Image display (2D mode)

1	Hospital logo & name, Date & time	**14**	Transducer orientation marker
2	Patient ID	**15**	Gray scale bar/Color scale bar
3	Operator ID, Transducer name	**16**	Depth scale marker
4	Mechanical index, Thermal index	**17**	Focal zone marker
5	Quick Menu: Start Screen, Patient Registration, End Exam, E-View, Browser, Report, New Preset, Image Preset, System Preset, Dicom Spooler, Close	**18**	Image parameter
		19	Cine gauge bar
		20	Cine playback control (Run/Stop)
6	Imaging mode selection	**21**	TGC slide controls
7	Image optimizing controls	**22**	Image area
8	Measurement	**23**	Image clipboard, Trash can
9	Annotation	**24**	Toolbar icons: XPEED, TGC slide controls, Initial, Clear, Clipboard, Virtual keyboard
10	Body pattern		
11	Page of controls	**25**	Appication selection
12	Freeze	**26**	End Exam
13	Save (Single, Multi)	**27**	Transducer temperature indicator

QWERTY Keyboard (Option)

The QWERTY keyboard is available which you can enter text or perform special functions.

Figure 1-3 QWERTY keyboard

Key functions

No.	Key	Control	Description
1	**Space**	**Freeze**	Use this control to start and stop scanning.
2	Alt (or 한/영)	**Save**	Use this control to capture images onto the clipboard.
3	**Up/Down (∧∨)**	**Depth**	Use this control to adjust the scanning depth of an image.
4	**Lt/Rt (<>)**	**Gain**	Use this control to adjust the amount of echo information displayed in an image.

Operating Requirements

Before using your system, you should consider the following requirements.

WARNING

Only qualified sonographers or physicians should perform scanning with the system.

Electrical Requirements

You should use a system with the specified power outlet as follows:

- 5V ⎓ 1A 4.2W Max

WARNING

Using the system in a wrong voltage range causes damages on the system.

Environmental Requirements

You should use this system in proper environment to prevent it from radio wave interference, dust and gas.

WARNING

Using the system in an inappropriate environment might cause unexpected problems.

Make sure the area, which your system is installed, is well-ventilated, with a temperature, humidity, and pressure requirements. If the system is exposed to inappropriate temperature, humidity, or pressure, adapt your system to normal range of environment for a few hours.

Table 1-3 Environmental requirements

	Temperature	Humidity	Pressure
Operation	10–35 °C	30–75 %	700–1060 hPa
Storage	-25–60 °C	20–90 %	700–1060 hPa
Transportation	-25–60 °C	20–90 %	700–1060 hPa

CAUTION

Before powering the system on, make sure that the system meets the operational conditions in temperature and humidity.

Software Installation

minisono Installation USB flash drive consists of the following items:

- Base Software: MiniSonoBaseSetup_v1.x.x.x.exe
- Application Software: minisono_sw_v1.x.x.x.r.exe
- Documentations (Soft copy)

The software needs to be installed and activated before it can be used. Before you install the software, make sure that your device meets or exceeds the minimum specifications. For more information about the minimum specification of the divice, see "Device Requirements" on page 1-7.

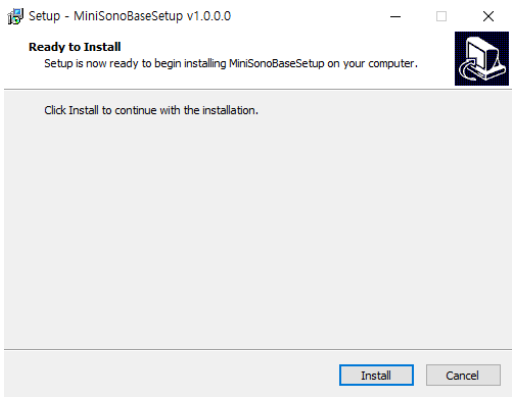
Installing Base Software

CAUTION

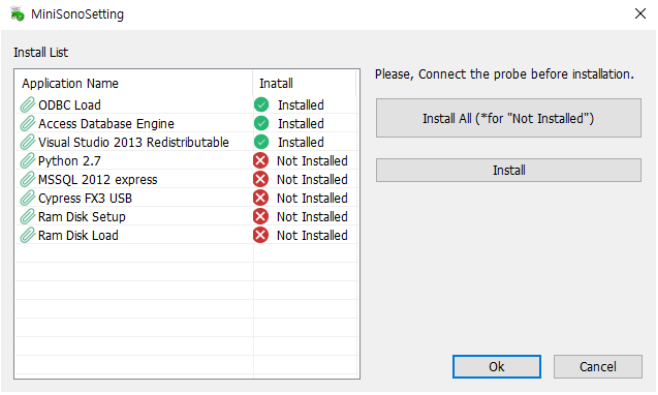
- Be sure that you have an administrator rights to install the software.
- Prior to installing minisono, we recommend that you connect the transducer to the device.

To install the Base Software on Windows,

1. Insert the minisono Installation USB flash drive into the device's USB port.
2. Download the minisono installation files to local hard drive.
3. Double-tap the MiniSonoBaseSetup.exe file. The ***Setup*** window is displayed.



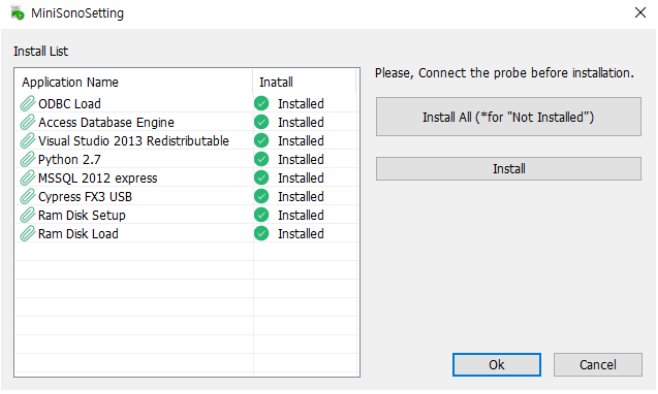
4 Tap **Install** to continue with the installation. The MiniSonoSetting starts automatically.



5 If some files are not installed, tap **Install All**.

6 Some of programs doesn't install automatically. In this case, select the uninstalled program, and then tap **Install**.

7 When all files are installed, tap **OK** to complete the installation software.



8 Restart the system.

9 When the device is restarted successfully, it is ready to install an application software.

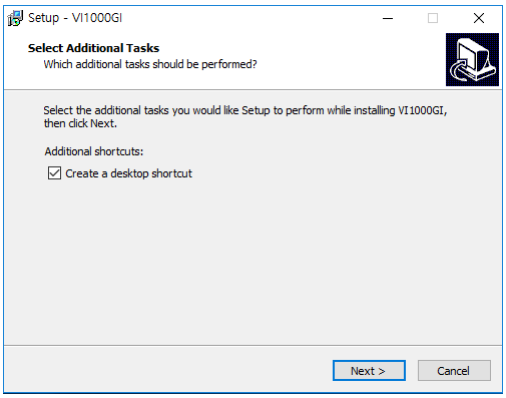
Installing Application Software

CAUTION

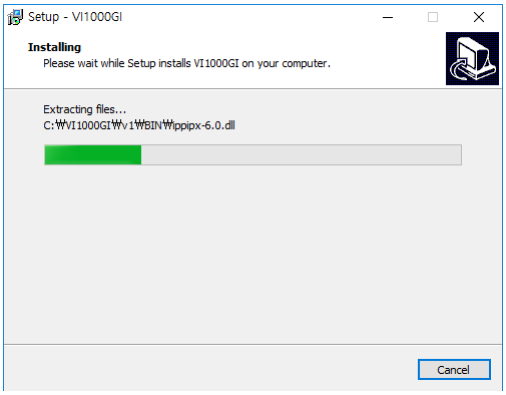
Base software should also be installed prior to the application software.

To install the Application Software,

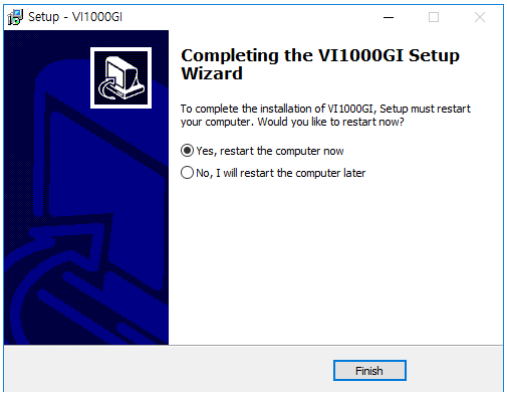
1 Double-tap the minisono_sw_v1.x.x.x.r.exe file. The ***Setup*** window is displayed.



2 Tap **Next t**o continue with the installation. The installation process starts automatically, and the progress bar appears while installing the software.



3 When the software installation is completed, the ***Complete*** window is displayed.



4 Select **Yes, restart the computer now**, and tap **Finish** to end the installation and restart the device.

NOTE

The device needs to be restarted before the software can be used.

5 When the device is restarted successfully, you can find a MiniSono icon ( ) on the desktop background.

System Start-Up

Power the Device On/Off

NOTE

For instructions on powering the device on or off, refer to the documentation that accompanies your device.

To power on the device,

1. Plug the power cord into the power outlet, if necessary.
2. Connect the power connector to the charging port on the device, if neccessary.
   A light appears near the end of the connector when the device is getting power.
3. Press and release the **Power** button on your device. The device turns on and setup begins.

NOTE

ALPINION MEDICAL SYSTEMS recommends that your device be fully charged before you start imaging. To avoid unexpected battery discharging, charge your device at regular intervals, or when the device displays the low-battery warning.

To power off the device,

1. Select Start () icon in the taskbar to open the Start menu.
2. At the lower left of the Start menu, select **Power,** and then select **Shut down** to turn off the device.

Turn the minisono System On/Off

To turn the minisono system on,

1. Before you turn on the system, disconnect the transducer and all peripheral devices.
2. Double-tap the MiniSono icon ().
   The system turns on and the Start screen appears.

To turn the minisono system off,

1. Before you turn off the system, end the current exam.
2. Tap the Quick menu icon (▽) on the display, and then tap **Close**.
   The dialog box appears.
3. Tap **Exit**.

Start screen display

When you turn the system on, the Start screen displays.

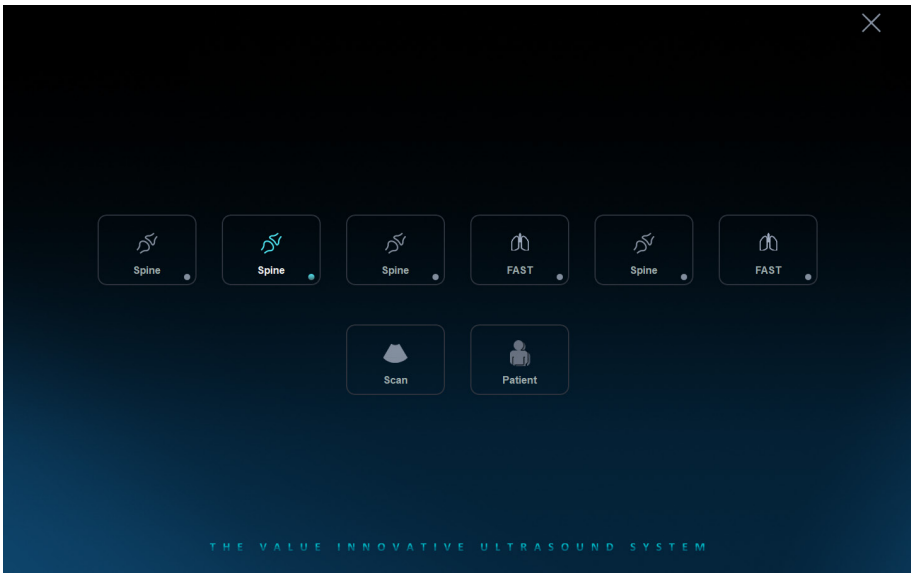


Figure 1-4 Start screen

The system has three main modules accessible from the Start screen: User Presets, Scan, and Patient.

- **User Presets**: Specify the user-defined application presets.
- **Scan**: Enter the 2D-mode scan screen.
- **Patient**: Display the ***Patient*** screen.

System Protection

If the system access control has been set by the administrator, you can access the patient data in the system only after you log on the system.

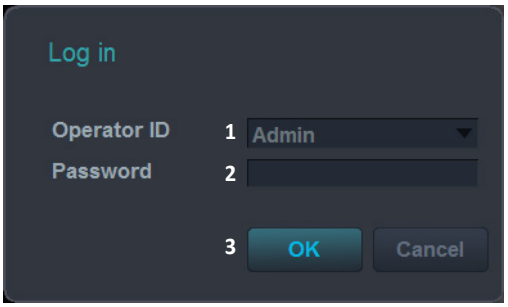


Figure 1-5 System Log In window

No.	Icon	Description
1	**Operator ID**	Select the Operator ID.
2	**Password**	Enter Operator's password.
3	**OK/Cancel**	Select OK or Cancel.

NOTE

To set the operator ID and password to log on the system, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Administration** > **Users** and enter the information in the ***Identity*** field.

Transducer

The transducer is the most important factor in image quality. Optimal imaging cannot be obtained without the correct transducer.

Transducer Components

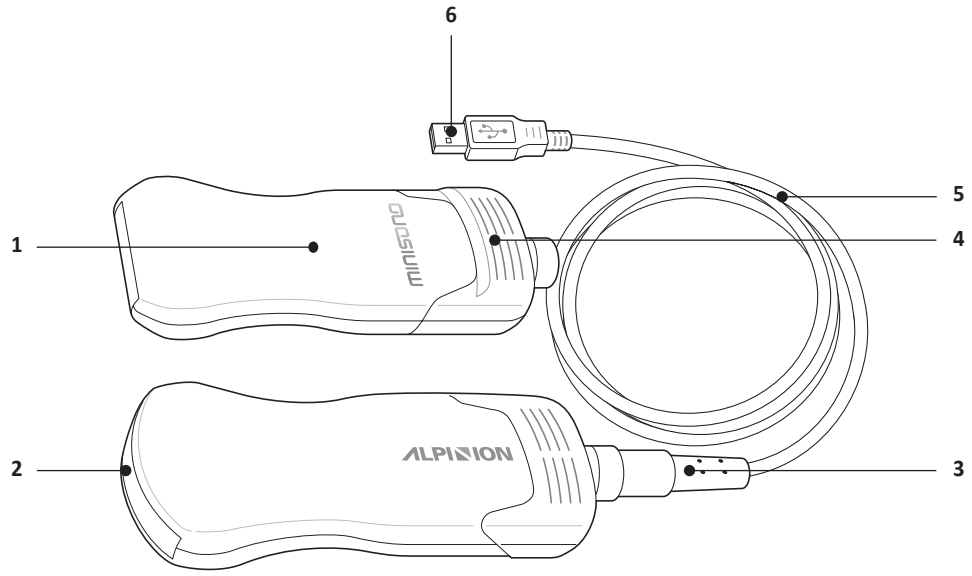


Figure 1-6 Transducer components

No.	Component	No.	Component
1	Transducer handle	**4**	Ventilation slots
2	Transducer lens	**5**	Transducer cable
3	Transducer strain relief	**6**	Connector electrical contacts

Clinical Applications

Table 1-4 Transducers and supported clinical applications

Transducer	Clinical Applications
minisono C1-6	Abdomen (ABD), Spine (SPINE), Focused Assessment with Sonography for Trauma (FAST)
minisono L3-12	Vascular (VAS), Small Parts (SMP), Musculoskeletal (MSK), Anesthesia (ANETHESIA), Focused Assessment with Sonography for Trauma (FAST)

Connecting the Transducer

CAUTION

Do not forcibly insert the transducer connector to the device. Improper connection may cause damages to the device and transducer.

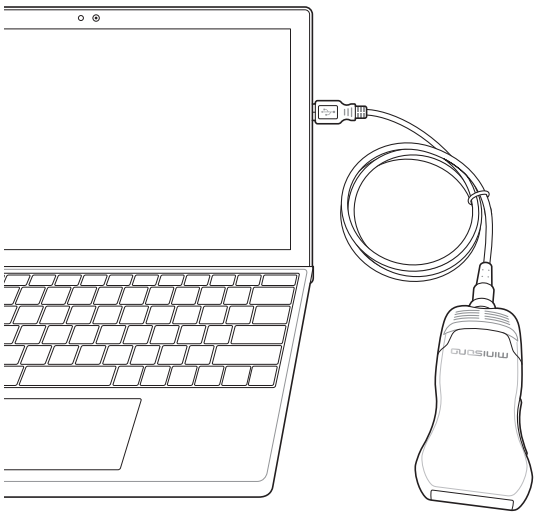


Figure 1-7 Connecting the transducer

To connecting the transducer to the system,

1. Plug the transducer into the USB port on the device.
2. When initialization is complete, the transducer name appears on the display.

NOTE

Selecting the **Automatic Preset selection when changes the Transducer** check box shows the default application and preset for the selected transducer.

Disconnecting the Transducer

CAUTION

Before disconnecting the transducer, tap **Freeze**. An error may occur when you disconnect the transducer while the system is running.

To disconnecting the transducer from the system,

1. Check if you tap **Freeze**.
2. Pull out the transducer connector from the USB port.

Transducer Temperature Icons and Status

The following temperature icons describes the status of the transducer temperature and shown on the bottom right of the screen. With the temperature icons, you can easily check the transducer temperature level. If the temperature of your transducer is too high, the image is frozen automatically, preventing overheating of the transducer.

NOTE

- If the image is frozen because the temperature of the transducer is too high, wait 15 minutes before turning it on again.
- To avoid the transducer from overheating, you must turn off the system after performing the scanning for 30 consecutive minutes. Allow the transducer to cool for 15 minutes, and turn it on again.

Table 1-5 Transducer temperature and status icons (Still air)

Icon	Temperature	Note
	–38 °C	
	39–40 °C	
	41–43 °C	
	44–46 °C	The image is frozen automatically. Allow the transducer to cool for 10 minutes.
	47 °C–	The image is frozen automatically. Allow the transducer to cool for 15 minutes.

Transducer Accessories

Transducer sheath

Transducer sheaths help to prevent contamination from blood or body fluids during the examination, operation, or biopsy.

WARNING

- Always keep sheaths in a sterile state.
- Sheaths are disposable. Do not reuse them.
- If sheaths are torn or soiled after use, clean and disinfect the transducer.
- Some sheaths contain natural rubber latex and talc, which can cause allergic reactions in some individuals.

CAUTION

- Make sure that you do not use an expired sheath.
- Using pre-lubricated condoms as a sheath might damage the transducer.

To apply the transducer sheath,

1. Apply a water-based ultrasound gel to the inside of the sheath and onto the face of the transducer.
2. Hold the transducer by the cable relief and unroll the sheath onto the transducer.
   If necessary, cover the transducer cable as well.
3. Pull the transducer sheath tightly over the face of the transducer to remove wrinkles.
4. Secure the sheath to the transducer housing or cable relief with the adhesive tapes or elastic bands provided.
   If necessary, secure the sheath to the transducer and the transducer cable.
5. Inspect the sheath to ensure that there are no holes or tears.

Ultrasound Gel

The ultrasound gel helps to transfer the sound waves into the body during the examination. Using appropriate ultrasound gels may cause damage to the transducer. To prevent transducer damage, only use ultrasound gels approved or recommended by ALPINION. Refer to Download Center on website (http://www.alpinion.com/web/support/download.asp) for the latest list of compatible ultraound gels.

WARNING

Do not use mineral oil, lubricant oil, oil-based lotions, or other non-approved materials, as they may cause damage to the transducer.

2

Getting Started

This chapter introduces the followings:

Starting an Examination

You can enter the patient information on the ***Patient*** screen. When the patient information is entered, you can perform measurement and calculation, save images to the image archive, and send the images to a DICOM device. You can also identify the patient information on the patient banner and report screen.

CAUTION

To avoid patient identification errors, always verify the identification with the patient. Make sure the correct patient identification appears on all screens and hard copy prints.

To enter the ***Patient*** screen,

– From the Start screen, tab **Patient**.

– During an exam, tap Quick menu icon (▽) on the display, and then tap **Patient Reg.**.

Patient Screen

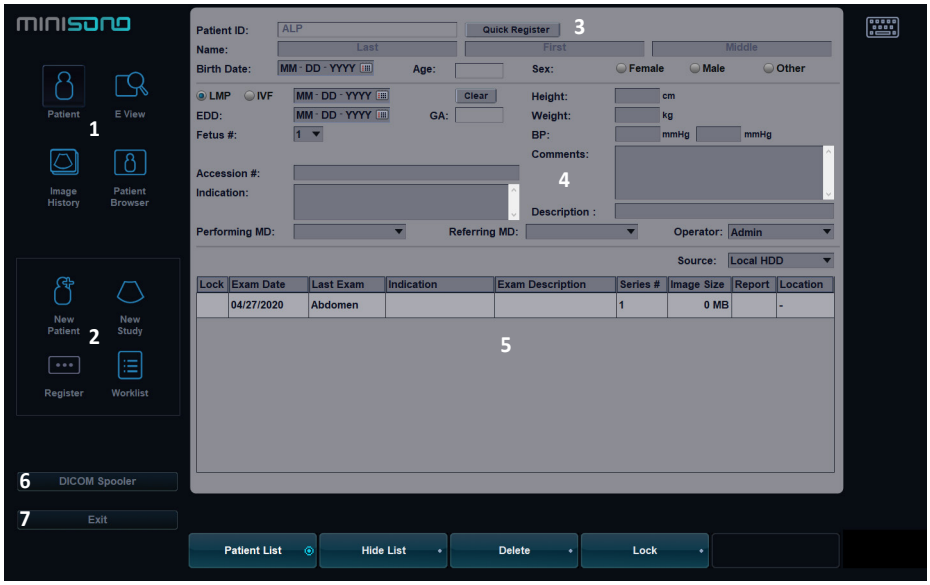


Figure 2-1 Patient screen

Table 2-1 Patient screen

No.	Function	Description
1	**Image management menu**	• Patient: Provide a creation of patient. • E View: Provide preview of the currently selected exam. • Image History: Provide a list of images per exam for the currently selected patient. • Patient Browser: Provide a search of patient.
2	**Function selection**	• New Patient: Use to clear patient entry screen in order to input a new patient's data into the database. • New Study: Use to create a new study on an existing patient. • Register: Use to enter new patient information into the database prior to the exam. If you are using **Quick Register**, do not select **Register**. • Worklist: Use to retrieve patient data from the worklist server.
3	**Patient information**	• Patient ID: Identification code for a patient • Name: Patient's last, first, and middle name • Birth Date: Patient's birth date • Age: Patient's age • Sex: Female, Male, Other
4	**Exam information**	Show the current/active exam information. All possible information needs to be entered.
5	**Patient list/Study list**	Display either patient or study list.
6	**DICOM Spooler**	Use the DICOM Spooler to monitor or control DICOM jobs.
7	**Exit**	Use to save all changes and exit the ***Patient*** screen.

To enter the patient information,

– Tap the text field you want to edit, and then tap the virtual keyboard icon ( ) in the upper right of the screen.

To navigate through each field on the ***Patient*** screen,

– Use the **[Tab]** key or **[Enter]** key on the virtual keyboard to move and fix the cursor.

To automatically generate a patient ID with current date and time,

– Tap **Quick Register**.

Patient list/Study list

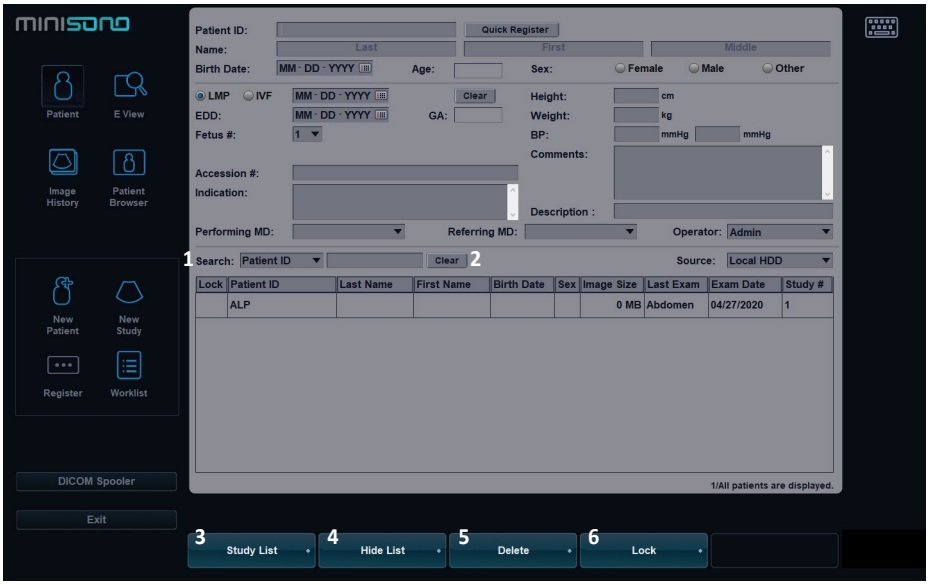


Figure 2-2 Patient list/Study list

Table 2-2 Patient screen menus

No.	Function	Description
1	**Search**	Select a search criteria.
2	**Clear**	Clear the search keyword.
3	**Patient list**	List the patients in the database.
	Study list	Display the list of all the exams for the current patient.
4	**Hide List**	Hide the Patient list or Study list.
5	**Delete**	• Delete one or more patient records from Patient list. • Delete one or more studies from Study list.
6	**Lock/Unlock**	Lock the patient data or study. Prevent move and delete functions.

Starting a new patient's exam

1. Tap the Quick menu icon (▽) on the display, and then tap **Patient Reg.**.
   The ***Patient*** screen appears.
2. To create a new patient record, tap **New Patient**.
3. Tap the ***Patient ID*** field and enter the patient information using the alphanumeric keyboard.
4. Enter the general exam information.
5. Tap **Register** to save the patient and application information.
6. Tap **Exit** to return to scanning.
7. Perform an exam.
8. Store the raw data to the clipboard.

NOTE

For more information about acquiring the still image or cine loop, "Acquiring Images" on page 2-29.

Starting a new exam on an existing patient

1. Tap the Quick menu icon (▽) on the display, and then tap **Patient Reg.**.
   The ***Patient*** screen appears.
2. Select a search criteria (Patient ID, Patient Name, Birth Date, Sex, Exam Date, and Locked) from the ***Search*** drop-down list and enter a search keyword.

NOTE

To view all registered patients while entering a search keyword, tap **Clear**.

3. The list of patients who match the criteria is displayed in the patient list.
4. Select the desired patient from the patient list.
5. If necessary, enter or edit the patient information.
6. Tap **New Study** to create a new study.
7. Tap **Exit** to return to scanning.
8. Perform an exam.
9. Store the raw data to the clipboard.

NOTE

For more information about acquiring the still image or cine loop, "Acquiring Images" on page 2-29.

Retrieving patient information via worklist

1. Tap the Quick menu icon (▽) on the display, and then tap **Patient Reg.**.
   The ***Patient*** screen appears.
2. Tab **Worklist** on the function selection to view patient data from the default worklist server.
3. To change the worklist server, select a source from the ***Source*** drop-down list.

   NOTE

   Before connecting to the worklist server, you need to configure worklist settings. To configure worklist settings, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Connectivity** > **Worklist**.
4. Tab **Worklist** to retrieve patient data from the worklist server.
   The search results appear on the list.
5. Select the patient you want to start a study.
6. Tap **Transfer** to transfer the selected study to the patient archive.

   NOTE

   Destination for transfer is always Local Archive HDD.

Ending an exam

When you have completed the study, tap the End Exam icon (End Exam) in the upper right of the screen. All images of the current study are saved in the local hard disk.

Retrieving and editing archived information

Searching for an existing patient

1. Tap the Quick menu icon (▽) on the display, and then tap **Patient Reg.**.
   The ***Patient*** screen appears.
2. Select a search criteria (Patient ID, Patient Name, Birth Date, Sex, Exam Date, and Locked) from the Search drop-down list and enter a search keyword.
   If you select Exam Date, you can select a desired period (Today, Last Week, Last Month, and Last 3 Months) and a specific date from the drop-down list.

   NOTE

   To view all registered patients while entering a search keyword, tap **Clear**.
3. The list of patients who match the criteria is displayed in the patient list.

Deleting the existing patient or study

CAUTION

Before deleting a patient or study, make sure you have already backed up the patient data using Backup Patient Archive or export function. After deleting the patient or study, you CANNOT recover it.

Deleting the existing patient

1. Search and select a patient from the patient list.
2. Tap **Delete**. The ***Message*** dialog box appears.
3. Tap **Yes** to delete the selected patient.

   NOTE

   When the patient you want to delete is locked, you cannot delete the patient by using **Delete**. You have to unlock the locked patient before deleting it.

Deleting the existing study

1. Select a study from the study list.
2. Tap **Delete**. The ***Message*** dialog box appears.
3. Tap **Yes** to delete the selected study.

   NOTE

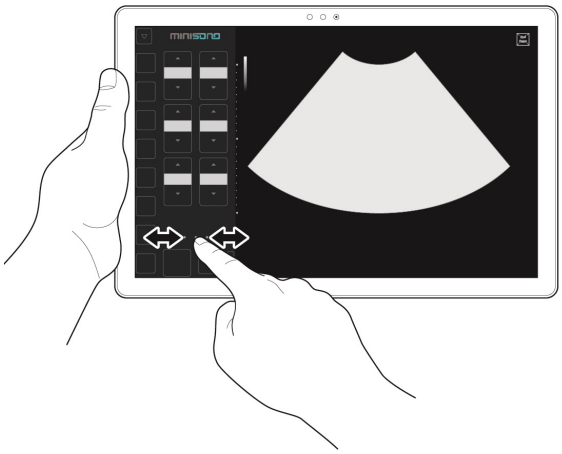
   When the study you want to delete is locked, you cannot delete the study by using **Delete**. You have to unlock the locked study before deleting it.

Optimizing the Image

Available imaging modes are 2D, M, CF, PD, and PW-Mode.

General workflow

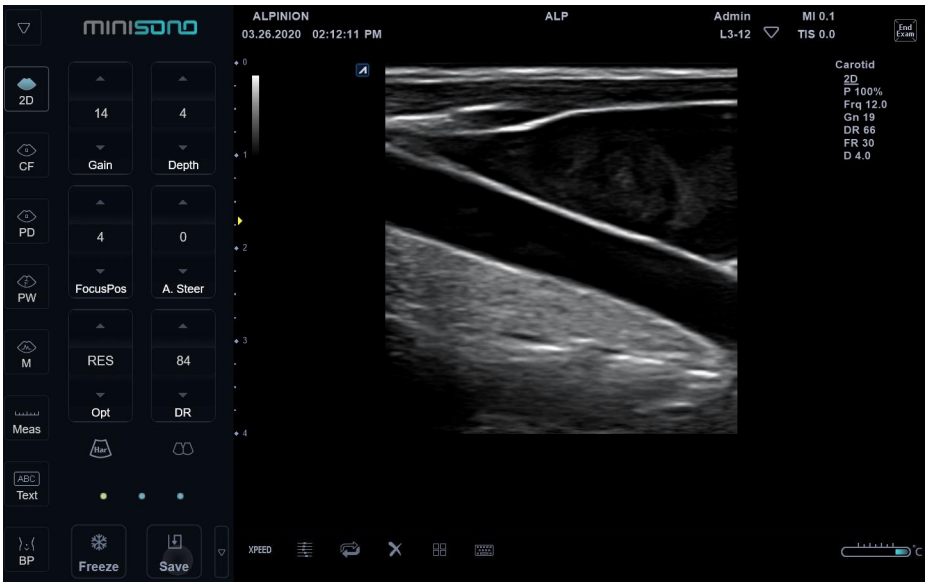
1. Tap the desired imaging mode.
2. Optimize the image using the image optimizing controls in the controls area.
   If necessary, tap the page indicator ( ) or swipe to move between pages of controls.



3. To reset the current image settings, tap the Initial icon ( ).
4. To enter another imaging mode, tap the corresponding mode.

2D Mode

In 2D mode ultrasound, your transducer simultaneously scans a plane through the body that can be viewed as a two-dimensional image on the screen. Two-dimensional images and measurements of the anatomical structures of soft tissues such as internal organs and vascularities can be determined.



Time Gain Compensation (TGC)

To compensate for weak signals or over-bright signals at various depths, you can adjust Time Gain Compensation (TGC) using the TGC slide controls. To activate or deactivate the TGC slide controls, tap the TGC icon ( ).

TGC slide control selectively adjusts the sensitivity (brightness) in depth.

– Slide the control to the left to decrease the gain in the corresponding specific 2D depth.

– Slide the control to the right to increase the gain in the corresponding specific 2D depth.

Dual Imaging

Using Dual imaging, you can view two images at the same time on the display.

To activate the image layout,

1. In 2D mode, Color Flow mode, or M mode imaging, tap the Dual image icon ( ). The image is shown on the left of the display.
2. Tap the Dual image icon ( ) again to activate the second image.
3. To switch between the two images, tap the Dual image icon ( ).
4. To exit the dual imaging, tap **2D** or tap the Single image icon ( ).

Xpeed™

Xpeed™ is an auto-optimizing technology that enables you to easily adjust an image's the contrast resolution and brightness uniformity. For using this feature, you need an additional request to your local agent. To activate or deactivate Xpeed, tap the Xpeed icon (XPEED).

Gain

Gain allows you to Increase or decrease in the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated. To increase or decrease overall gain, tap ▲ or ▼ of **Gain**.

Depth

Increasing the depth enables the deeper structures to be visualized. You can decrease the depth if you do not need the bottom portion of the display. To increase or decrease the depth, tap ▲ or ▼ of **Depth**. You can see the display and image parameters are automatically changed.

Focus Position

Focus Posision is used to change the location of the focal point. A triangular focus marker indicates the depth of the focal point. To move the focal zone to the near/far field, tap ▲ or ▼ of **FocusPos**. Focal zone position may vary depending on the depth, zoom, transducer, application, and selected frequency setting.

Angle Steer

In 2D mode, you can tilt an image left or right by using a linear transducer. To adjust the angle steer, tap ▲ or ▼ of **A. Steer**.

Optimization (Opt)

Optimization allows you to change center frequency to obtain increased resolution or increased penetration. To change the value, tap ▲ or ▼ of **Opt**.

- RES: Resolution
- GEN: General
- PEN: Penetration

Dynamic Range (DR)

Dynamic range is useful for optimizing tissue texture in different anatomy. Dynamic range should be adjusted so that the highest amplitude edges appear as white while lowest levels (such as blood) are just visible. To adjust the dynamic range, tap ▲ or ▼ of **DR**.

Tissue Harmonic Imaging (THI)

Tissue Harmonic Imaging (THI) is a system feature that can enhance the contrast resolution with fine tissue differentiation, benefiting patients with poor images. THI creates images from received signals using the harmonics of the transmitted frequency. For certain applications, Filtered THI (FTHI) can be used to optimize temporal resolution. To activate or deactivate THI, tap the Harmonic icon (

).

SRI

Speckle Reduction Imaging (SRI) is a smart solution that enables you to reduce unnecessary elements of your image such as speckles and image noises. To adjust SRI, tap ▲ or ▼ of **SRI**.

Spatial Compound

Spatial compound allows you to combine different steering frames to form a single frame at real-time frame rates. To adjust the spatial compound, tap ▲ or ▼ of **Spt.Comp**.

Power

Power controls the amount of acoustic power applied in all modes. To adjust the power, tap ▲ or ▼ of **Power**.

Persist

Persistence provides a visible smoothing effect to the 2D-mode image by persisting lines of image data for each frame of imaging. To adjust the persist, tap ▲ or ▼ of **Persist**.

Gray Map

Gray Map provides you with the system maps for 2D, M, and Doppler modes. To adjust the gray map, tap ▲ or ▼ of **Gray Map**.

Colorize

Colorize is the colorization of a conventional 2D mode image or Doppler Spectrum to enhance the user's ability to discern 2D mode, M mode, and Doppler mode intensity valuations. Colorize is NOT a Doppler mode. To adjust the colorize, tap ▲ or ▼ of **Colorize**.

Reject

Low echo information will not be displayed on the screen below the adjusted rejection level. The rejection function determines the amplitude level below which echoes are suppressed (rejected). Rejection set to high leads to bad tissue display. To adjust the rejection values, tap ▲ or ▼ of **Reject**.

Reverse

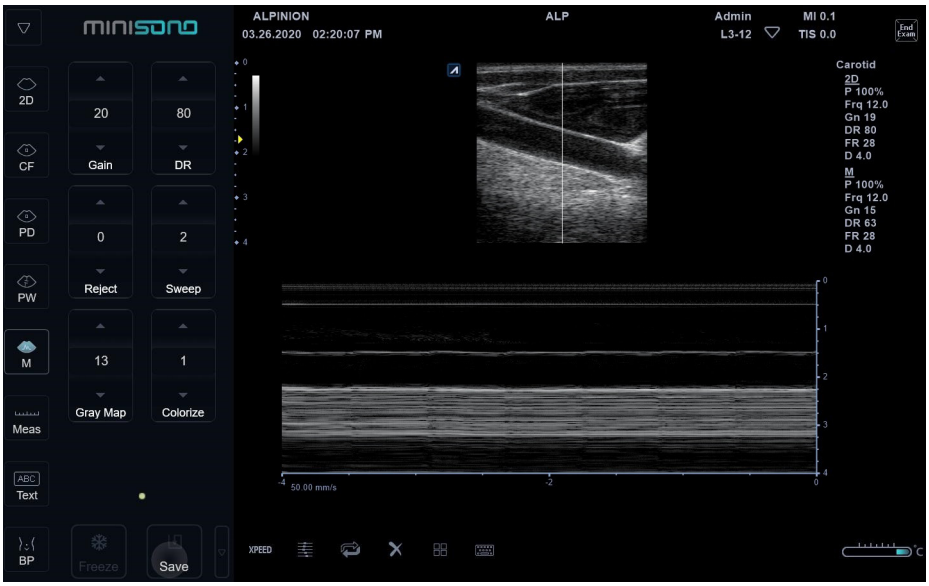
Reverse allows you to flip the image 180 degrees left/right. To flip the image horizontally, tap the reverse icon ( ).

Up/Down

Up/Down allows you to flip the image 180 degrees up/down. To flip the image vertically, tap the Up/Down icon ( ).

M Mode

In M mode, you can learn the movement of an area of anatomy. First, you position the M-line in the 2D image on the anatomy of Interest. Then you can display information about movement along that line in M mode trace. M mode trace can be helpful when you perform measurements, especially measuring the heart rate.



Gain

Gain allows you to Increase or decrease in the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated. To increase or decrease overall gain, tap ▲ or ▼ of **Gain**.

Dynamic Range (DR)

Dynamic range is useful for optimizing tissue texture in different anatomy. Dynamic range should be adjusted so that the highest amplitude edges appear as white while lowest levels (such as blood) are just visible. To adjust the dynamic range, tap ▲ or ▼ of **DR**.

Reject

Low echo information will not be displayed on the screen below the adjusted rejection level. The rejection function determines the amplitude level below which echoes are suppressed (rejected). Rejection set to high leads to bad tissue display. To adjust the rejection values, tap ▲ or ▼ of **Reject**.

Sweep Speed

During M mode imaging, you can adjust the sweep speed of the display. To increase or decrease the sweep speed, tap ▲ or ▼ of **Sweep**.

Gray Map

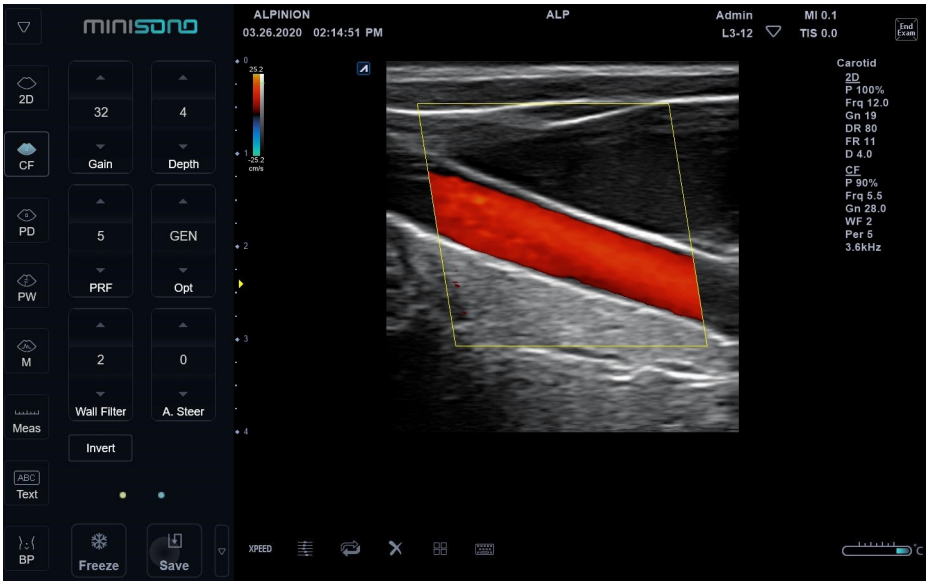
Gray Map provides you with the system maps for 2D, M, and Doppler modes. To adjust the gray map, tap ▲ or ▼ of **Gray Map**.

Colorize

Colorize is the colorization of a conventional 2D mode image or Doppler Spectrum to enhance the user's ability to discern 2D mode, M mode, and Doppler mode intensity valuations. Colorize is NOT a Doppler mode. To adjust the colorize, tap ▲ or ▼ of **Colorize**.

CF Mode

Color Flow mode is useful when you see the flow in a broad area. Color flow allows visualization of the flow in the CF ROI whereas Doppler mode provides spectral information in a smaller area.



Gain

Gain allows you to Increase or decrease in the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated. To increase or decrease overall gain, tap ▲ or ▼ of **Gain**.

Depth

Increasing the depth enables the deeper structures to be visualized. You can decrease the depth if you do not need the bottom portion of the display. To increase or decrease the depth, tap ▲ or ▼ of **Depth**. You can see the display and image parameters are automatically changed.

PRF

PRF function is used to adjust the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines the pulse repetition frequency (PRF). To raise or lower the velocity scale, tap ▲ or ▼ of **PRF**.

Optimization (Opt)

Optimization allows you to change center frequency to obtain increased resolution or increased penetration. To change the value, tap ▲ or ▼ of **Opt**.

- RES (Resolution): High frequency
- GEN (General): General frequency
- PEN (Penetration): Low frequency

Wall Filter

Wall filter filters out clutter signals caused from vessel movement. To raise or lower the wall filter, tap ▲ or ▼ of **Wall Filter**.

Angle Steer

You can tilt the ROI of the color flow image to the left or right by using a linear transducer. To adjust the angle steer, tap ▲ or ▼ of **A. Steer**.

Invert (Color Invert)

Invert allows you to view blood flow from a different perspective, e.g., red away (negative velocities) and blue toward (positive velocities). You can invert a real-time or frozen image. To reverse the color flow, tap **Invert**.

Smooth

Smooth allows you to make a color image smoother by enhancing connection in the axial direction. To adjust the smooth, tap ▲ or ▼ of **Smooth**.

Threshold

Threshold assigns the grayscale level at which color information stops. To increase or decrease the grayscale threshold, tap ▲ or ▼ of **Threshold**.

Power

Power controls the amount of acoustic power applied in all modes. To adjust the power, tap ▲ or ▼ of **Power**.

Persist

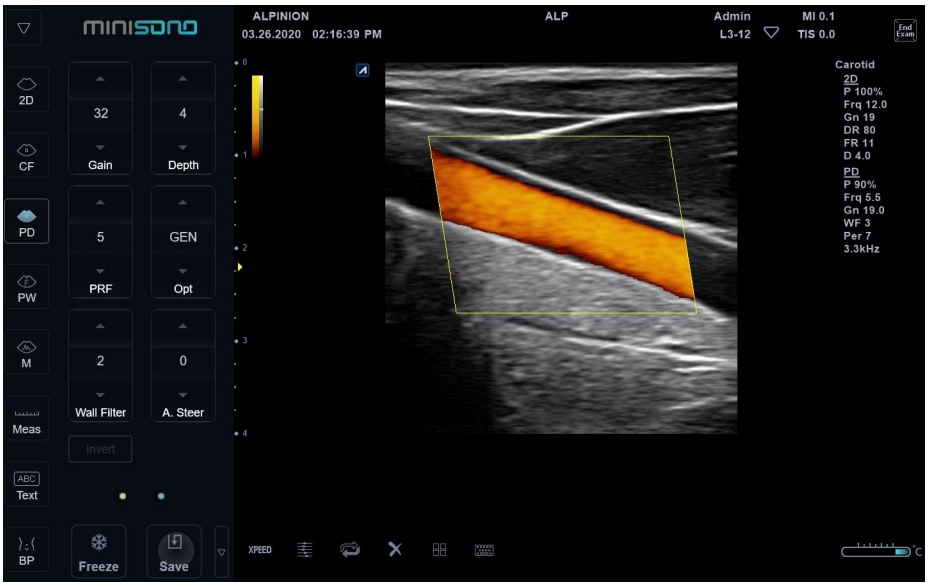
Persistence provides a visible smoothing effect to the 2D-mode image by persisting lines of image data for each frame of imaging. To adjust the persist, tap ▲ or ▼ of **Persist**.

Color Map

Color Map allows you to change the color map used for Color Flow mode, Power Doppler mode and Tissue Doppler Imaging mode. To adjust the color map, tap ▲ or ▼ of **Color Map**.

PD Mode

Power Doppler imaging is another way of color flow mapping technology which maps the strength of the Doppler signal from the blood flow. Power Doppler mode, unlike Color Flow mode, displays color flow imaging by using the number of reflectors that are moving. Therefore, this mode has no aliasing and is able to measure the slow blood flow.



Gain

Gain allows you to Increase or decrease in the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated. To increase or decrease overall gain, tap ▲ or ▼ of **Gain**.

Depth

Increasing the depth enables the deeper structures to be visualized. You can decrease the depth if you do not need the bottom portion of the display. To increase or decrease the depth, tap ▲ or ▼ of **Depth**. You can see the display and image parameters are automatically changed.

PRF

PRF function is used to adjust the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines the pulse repetition frequency (PRF). To raise or lower the velocity scale, tap ▲ or ▼ of **PRF**.

Optimization (Opt)

Optimization allows you to change center frequency to obtain increased resolution or increased penetration. To change the value, tap ▲ or ▼ of **Opt**.

- RES: Resolution
- GEN: General
- PEN: Penetration

Wall Filter

Wall filter filters out clutter signals caused from vessel movement. To raise or lower the wall filter, tap ▲ or ▼ of **Wall Filter**.

Angle Steer

In Power Doppler mode, you can tilt an image left or right by using a linear transducer. To adjust the angle steer, tap ▲ or ▼ of **A. Steer**.

Invert (Color Invert)

Invert allows you to view blood flow from a different perspective, e.g., red away (negative velocities) and blue toward (positive velocities). You can invert a real-time or frozen image. To reverse the color flow, tap **Invert**.

Smooth

Smooth allows you to make a color image smoother by enhancing connection in the axial direction. To adjust the smooth, tap ▲ or ▼ of **Smooth**.

Threshold

Threshold assigns the grayscale level at which color information stops. To increase or decrease the grayscale threshold, tap ▲ or ▼ of **Threshold**.

Power

Power controls the amount of acoustic power applied in all modes. To adjust the power, tap ▲ or ▼ of **Power**.

Persist

Persistence provides a visible smoothing effect to the 2D-mode image by persisting lines of image data for each frame of imaging. To adjust the persist, tap ▲ or ▼ of **Persist**.

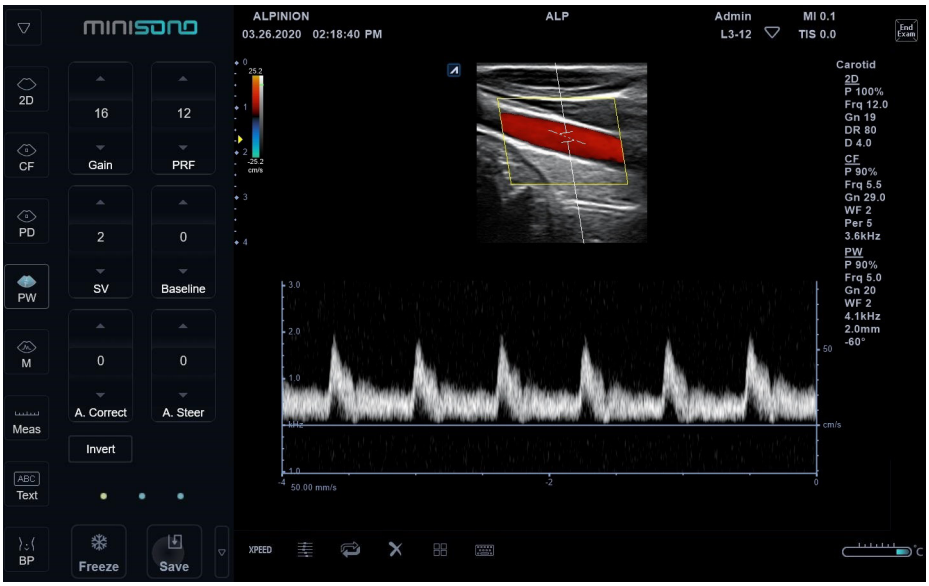
Color Map

Color Map allows you to change the color map used for Color Flow mode, Power Doppler mode and Tissue Doppler Imaging mode. To adjust the color map, tap ▲ or ▼ of **Color Map**.

PWD Mode

Pulsed Wave Doppler (PWD) is a Doppler mode that measures velocity in a PW sample volume and displays that information in a spectral trace with an audio output.

Doppler is intended to provide measurement data concerning the velocity of moving tissues and fluids. PW Doppler lets you examine the blood flow data selectively from a small region called the sample volume.



Gain

Gain allows you to Increase or decrease in the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated. To increase or decrease overall gain, tap ▲ or ▼ of **Gain**.

PRF

PRF function is used to adjust the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines the pulse repetition frequency (PRF). To raise or lower the velocity scale, tap ▲ or ▼ of **PRF**.

Doppler sample volume length

Size the sample volume gate. To increase or decrease the gate size, tap ▲ or ▼ of **SV**. You can adjust the sample volume gate length whenever the sample volume gate appears on the display.

Baseline

Baseline adjusts the Color Flow or Doppler spectrum baseline to accommodate higher velocity blood flow to eliminate aliasing.

Baseline adjusts the alias point. The default baseline is at the midpoint of the spectrum.

To adjust the baseline, tap ▲ or ▼ of **Baseline**.

Angle Correct

Estimate the flow velocity in a direction at an angle to the Doppler vector by computing the angle between the Doppler vector and the flow to be measured.
Flow toward the transducer is mapped above the baseline and vice versa. To adjust the angle relative to the transducer face, tap ▲ or ▼ of **A. Correct**. The velocity scale changes when you adjust angle correct.

Angle Steer

Angle steer tilts the sample volume for the Doppler spectrum. This function is only for linear transducers. To adjust the angle steer, tap ▲ or ▼ of **A. Steer**.

Invert

Invert vertically inverts the spectral trace without affecting the baseline position. To invert the spectral trace, tap **Invert**. The plus (+) and minus (-) signs on the velocity scale are reversed when the spectrum is inverted. Positive velocities display below the baseline.

Auto Calculation

Activate the calculation automatically when the system is in a state of freeze or live. To activate or deactivate the Auto Calc, tap **Auto Calc**.

Direction

Direction is used to specify the part of the spectrum to calculate when using Auto Calc. To adjust the direction, tap ▲ or ▼ of **Direction**.

Method

Method is used to trace the average mean and peak velocities in realtime or frozen images. To adjust the method, tap ▲ or ▼ of **Method**.

Sensitive

Sensitive is used to set the sensitivity of tracing in the spectrum. To adjust the sensitive, tap ▲ or ▼ of **Sensitive**.

Sweep Speed

Sweep speed allows you to adjust the sweep speed of the Doppler spectrum. To increase or decrease the sweep speed, tap ▲ or ▼ of **Sweep**.

Optimization (Opt)

Optimization allows you to change center frequency to obtain increased resolution or increased penetration. To change the value, tap ▲ or ▼ of **Opt**.

- RES: Resolution
- GEN: General
- PEN: Penetration

Wall Filter

Wall filter filters out clutter signals caused from vessel movement. To raise or lower the wall filter, tap ▲ or ▼ of **Wall Filter**.

Power

Power controls the amount of acoustic power applied in all modes. To adjust the power, tap ▲ or ▼ of **Power**.

Reject

Low echo information will not be displayed on the screen below the adjusted rejection level. The rejection function determines the amplitude level below which echoes are suppressed (rejected). Rejection set to high leads to bad tissue display. To adjust the rejection values, tap ▲ or ▼ of **Reject**.

Gray Map

Gray Map provides you with the system maps for 2D, M, and Doppler modes. To adjust the gray map, tap ▲ or ▼ of **Gray Map**.

Colorize

Colorize is the colorization of a conventional 2D mode image or Doppler Spectrum to enhance the user's ability to discern 2D mode, M mode, and Doppler mode intensity valuations. Colorize is NOT a Doppler mode. To adjust the colorize, tap ▲ or ▼ of **Colorize**.

Imaging Features

The system offers imaging features that provide improved imaging and greater flexibility when you perform the scan.

Freezing an image

Freezing a real-time image stops all movement and allows you to perform measurements and record images.

To freeze an image,

– While scanning an image, tap **Freeze**.

To reactivate the image,

– Tap **Freeze** again.

Displaying a centerline

You can display a centerline during live imaging.

To display the centerline,

– Tap the centerline icon ( ).

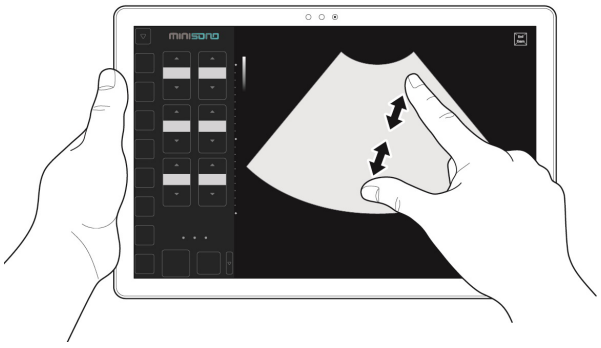
To hide the centerline,

– Tap the centerline icon ( ) again.

Zooming images

To zoom in and out of an image,

– Pinch or spread your fingers on the display screen.



Using CINE

You can acquire and save a loop from the current exam. The cine loops are identified by the film icon ( ) located in the bottom right corner of the thumbnail.

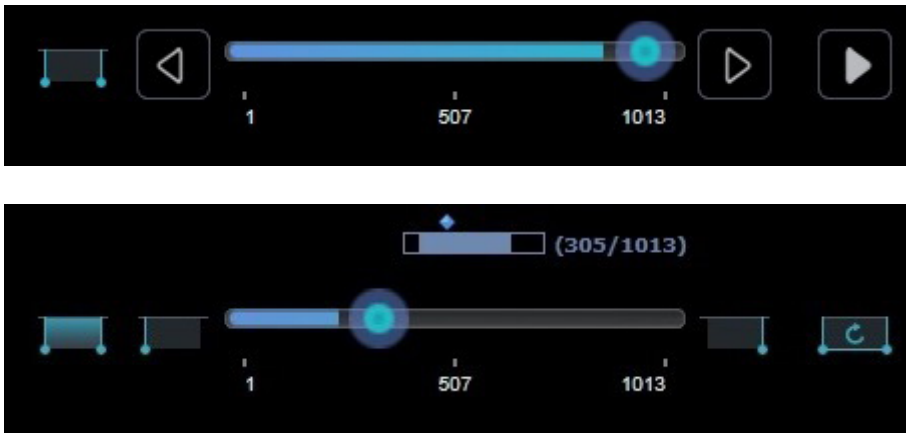


Figure 2-3 Cine gauge bar

Table 2-3 Cine mode controls

Control	Control Name	Description
	Play/Stop	Start/Stop the cineloop review.
	Step Backward	Step a single frame barkward.
	Step Forward	Step a single frame forward.
	Edit Clip	Enter the Edit Clip mode.
	Start Frame	Define new beginning point of a loop of cine data.
	End Frame	Define new ending point of a loop of cine data.
	Reset	Reset the beginning and ending points to their originally acquired positions.

Activating cine loops

1. Tap **Freeze**. The cine controls appear.
2. Use the cine controls to play the cine loop.

Playing cine loops

1. Tap **Freeze**. Or select the cine loop thumbnail on the clipboard.
2. If you need edit the cine loop, tap Edit Clip icon( ).
3. Select the start frame, and tap the Start Frame icon ( ).
4. Select the end frame, and tap the End Frame icon ( ).
5. When editing the cine loop is completed, tap Edit Clip icon( ).
6. Tap the Play icon ( ) to run the cine loop.
7. Tap the Step Backward icon ( ) to step a single frame backward.
8. Tap the Step Forward icon ( ) to step a single frame forward.
9. Drag the marker on the cine bar to find the specific frame.
10. Tap **Save** to store the cine loop. The cine loop is stored and a thumbnail is displayed on the clipboard.
11. Tap the Play icon ( ) again to stop the cine loop.
12. Tap **Freeze** to return to scanning.

Acquiring Images

You can acquire and save an image and cine loops from the current examination. The images and cine loops that are stored during a current examination are displayed as thumbnails on the clipboard.

Acquiring images

To save the still image,

1. If necessary, tap the frame selection icon (▽) beside the **Save**, and then tap **Single**.
2. While scanning in any mode, tap **Save**.
   The image is stored and a thumbnail is displayed on the clipboard.

Acquiring cine loops

To store the cine loop,

1. If necessary, tap the frame selection icon (▽) beside the **Save**, and then tap **Multi**.
2. While scanning in any mode, tap **Save**.
   The cine loops is stored and a thumbnail is displayed on the clipboard.

NOTE

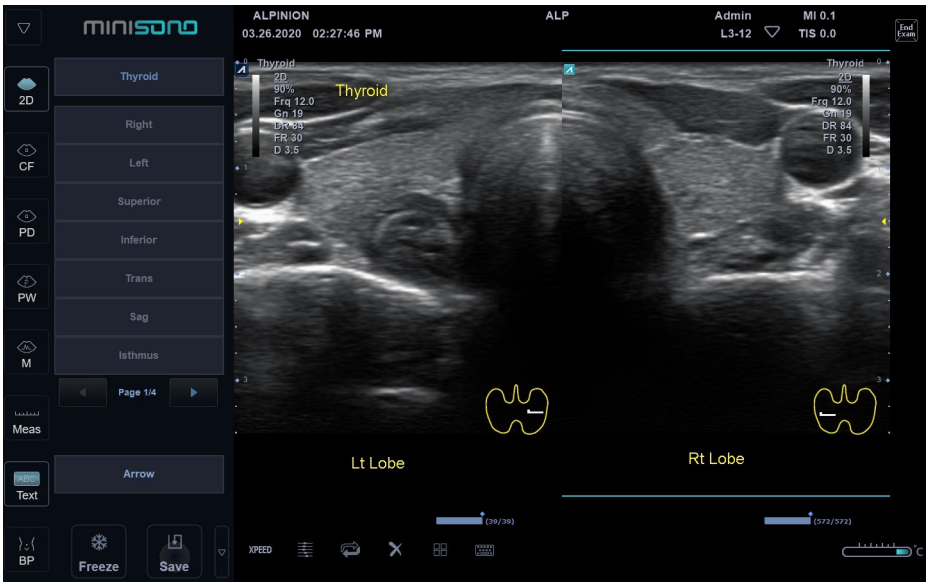
The cine loops are identified by the film icon ( ) located in the bottom right corner of the thumbnail.

Annotations

You can place text labels and arrow marks on an image to identify anatomical structures and positions and also annotate an image with a body pattern image that indicates the part of the anatomy that you are scanning.

NOTE

The annotation feature is available in live-acquisition mode and in freeze mode.



Inserting an annotation

To add texts and arrows,

1. Obtain the image you want to annotate.
2. Tap **Text** on the display. A vertical bar type cursor appears on the screen.
3. Drag the cursor to a location on the screen.
4. Insert an annotation.
   - To insert free text,
     a. Tap the virtual keyboard icon ( ). The virtual keyboard appears.
     b. Type the desired text using the alphanumeric keyboard.
     If necessary, tap **Enter** to change or add line.
   - To insert pre-defined text,
     a. The comment library appears on the left siafe of the display.
     b. If necessary, select the desired application.
     c. Tap the desired text from the comment library.

NOTE

- The default text color is yellow. The color selection can be changed to any of the colors available on the system.
- When a specific comment or comment group is selected, the color turns to green. Once the comment is set or fixed, the color returns to yellow or to the user-selected color.

5 To add an arrow, tap **Arrow**. An arrow appears on the display.

6 Drag the arrow to a location on the screen.

7 If necessary, tap ◂ or ▸ of **Angle** to adjust the direction of the pointer head.

8 To delete all comments as well as arrow marks, tap the Clear icon (✕) on the display.

9 To exit the annotation function, tap **2D**.

Inserting a body pattern

To insert a body pattern,

1 To activate Body Pattern, tap **BP** on the display.
A list of body patterns appears on the left side of the display.

NOTE

- A default body pattern is displayed automatically when Body Pattern is activated.
- To configure the body pattern list, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Annotation** > **BodyPattern** and customize the body pattern list.
- The body pattern list that appears on the screen will vary depending on the selected application.

2 Select the desired body pattern.
The body pattern with a transducer marker is shown on the screen.

3 To adjust the angle of the transducer marker, tap ◂ or ▸ of **Angle**. The each level of the angle increment/decrement is 15 degrees.

4 Tap and drag the transducer marker to adjust the position.

To delete a body pattern,

– Tap the Clear icon (✕) on the display.

Managing Image and Patient Data

Clipboard

The clipboard shows captured ultrasound images for a quick review. Tapping **Save** captures an active image and displays a preview image on the clipboard. When reloading the previous study, the images belong to that study are shown on the clipboard.

NOTE

The clipboard is not shown on the screen as a default.

To display the hidden clipboard,

– Tap the Clipboard icon ( ) on the display.

Capturing onto the clipboard

Tap **Save** to capture images onto the clipboard. You can see thumbnail images on the clipboard.

Reloading images from the clipboard

Tap the image you want to reload on the clipboard.

Saving images permanently

1. Tap the Quick menu icon (▽) on the display, and then tap **E-View**.
   The images on the clipboard appear expanded on ***E-View*** screen.
2. Select the images (still image or cineloop) you want to store, or tap **Select All** to select all images.
3. Tap **Archive** to store the image(s) permanently.

NOTE

The archived images are identified by the Archived icon ( ) located in the upper right corner of the image.

E-View

The E-View feature allows you to review the current study images or saved study images. While reviewing, you can print an image, send an image to a DICOM device, or save an image to a removable media.

CAUTION

You may lose patient information files such as patient's basic information and scanned images because of physical shocks to the product or internal errors. Therefore, you should back up patient's basic information and scanned images on a regular basis. ALPINION MEDICAL SYSTEMS does not have the responsibility for data loss caused by the user's carelessness.

To enter the ***E-View*** screen,

– From the ***Patient*** screen, tap **E View**.

– During an exam, tap Quick menu icon (▽) on the display, and then tap **E-View**.

E-View Screen

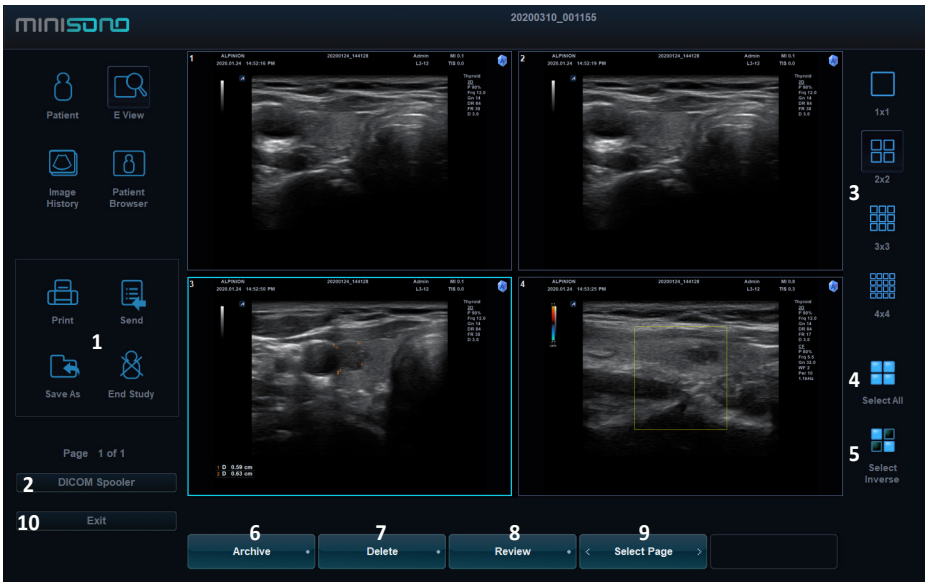


Figure 2-4 E-View display

Table 2-4 E-View screen

No.	Function	Description
1	**Function selection**	• Print: Print images via the standard printer. • Send: Send the saved images through the network. • Save As: Save images to a removable media. • End Study: End a study immediately.
2	**DICOM Spooler**	Use the DICOM Spooler to monitor or control DICOM jobs.
3	**Display Format**	Set 1x1, 2x2, 3x3, or 4X4.
4	**Select All**	Select all images.
5	**Select Inverse**	Inversely, select remained images.
6	**Archive**	Store the image(s) in the local hard disk.
7	**Delete**	Delete the selected image(s).
8	**Review**	Use to review an image. The image is shown on the scan screen.
9	**Select Page**	Use to move to the next page.
10	**Exit**	Use to exit the ***E-View*** screen.

Print

On the ***E-View*** screen, you can print image(s) via the standard printer.

To print out image(s),

1. Tap the desired image(s).
2. Tap **Print**. The dialog box appears.
3. Select a standard (default) printer and set up the printing options.
   - **Invert Image**: Invert color between images and background.

   NOTE

   To configure the standard printer, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **System** > **Peripheral** > **Standard Printer**.
4. When you have finished, tap **Print**. The selected printer prints out the selected image(s).

Send

On the ***E-View*** screen, you can transfer patient(s) data to the DICOM device such as DICOM storage or DICOM Print.

To send from the local HDD to a DICOM device,

1. Tap the desired image(s).
2. Tap **Send**. The dialog box appears.
3. Select the destination device from the drop-down list.
4. Tap **Send**. The progress bar appears during transferring files.

Save As

On the ***E-View*** screen, you can export images or studies from your PC to a removable media, extension drive, and network storage.

To export images or studies to storage media,

1. Tap the desired image(s).
2. Insert your removable media to the media tray properly.
3. Tap **Save As**. The dialog box appears.
4. Select a media from the ***Device*** drop-down list.
5. The system automatically creates a file name.
6. Select an image format in the ***Type*** field.
   To save cine images as a video file, skip to step 9.

Table 2-5 Image format

Format	Function
DCM	Save a still image as standard DICOM format. It is possible to specify compression type and quality.
BMP	Save a still image as BMP format.
JPEG	Save a still image as JPEG format. It is possible to specify compression type and quality.

NOTE

To view a DICOM format image on your PC, you need a dedicated DICOM viewer.

7 If you selected **DCM** in step 6, select a compression type in the ***Compression*** field.

8 If you selected **JPEG** in step 6, select an image quality in the ***Quality*** field.

9 Select a video file format.

- **2D Cine(*WMV)**: Save 2D Cine images as WMV format.

10 When you have finished, tap **Save**. The progress bar appears during exporting files.

End Study

To end a study immediately,

– Tap **End Study**. The ***Patient*** screen appears.

Image History

Image History allows you to review all previous studies for the selected patient. When you access Image History, the study information with the study date and location appears in a table.

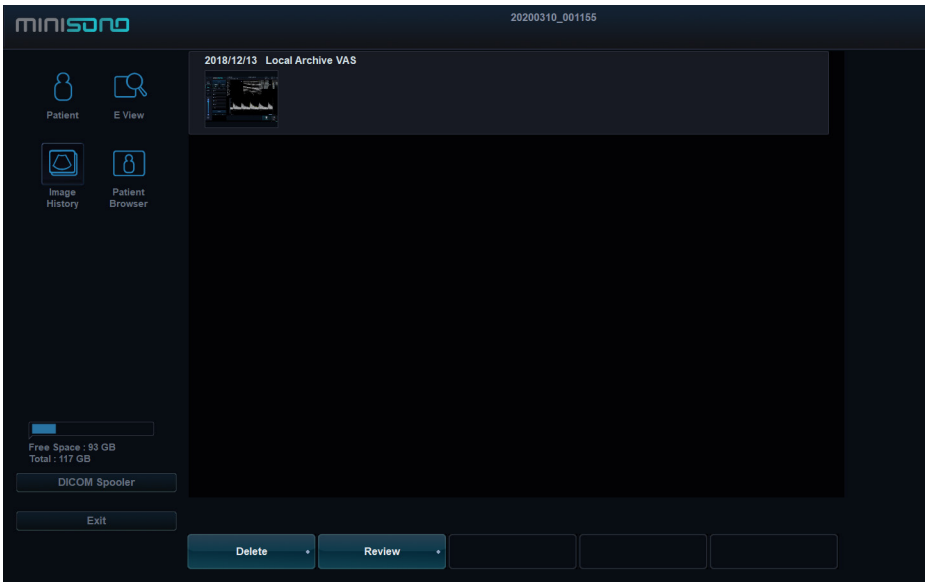


Figure 2-5 Image History display

To review an image,

1. Tap the Quick menu icon (▽) on the display, and then tap **Patient Reg.**.
   The ***Patient*** screen appears.
2. Select the desired patient from the patient list.
3. Tap **Image History**. All of the studies for the selected patient are listed by chronological order.
4. Select an image in the desired study. The white-colored frame appears on the selected image.
   To review multiple images between different studies, select desired images of the studies you want. You can select up to four (4) images at one time.
5. Tap **Review** to review the image.
6. Tap **Delete** to delete the image.
7. When you have finished, tap **Exit** to return to scanning.

Patient Browser

The system provides a patient browser that allows fast and easy image management. Patient Browser allows you to view the whole patient from local database or removable media, export/import, save as with PC friendly format and send DICOM images to remote server over the network.

To enter the ***Patient Browser*** screen,

– From the ***Patient*** screen, tab **Patient Browser**.

– During an exam, tap the Quick menu icon (▽) on the display, and then tap **Browser**.

Figure 2-6 Patient Browser display

Table 2-6 Patient Browser screen

No.	Function	Description
1	**Function selection**	• Image View: View the saved images for the selected patient. • Export: Export the patient information. • Save As: Save the image as a different file format. The supported file formats are JPEG, BMP, DCM, AVI, and WMV. • Send: Send the saved images through the network.
2	**DICOM Spooler**	Use the DICOM Spooler to monitor or control DICOM jobs.
3	**Display Format**	Set 1x1, 2x2, 3x3, or 4X4.
4	**Select All**	Select all images.

No.	Function	Description
5	**Select Inverse**	Inversely, select remained images.
6	**Lock/Unlock**	Lock the patient data or study. Prevent move and delete functions.
7	**Delete**	Delete the selected image(s).
8	**Select Page**	Use to move to the next page.
9	**Exit**	Use to exit the ***E-View*** screen.

List View

List View allows you to search and quick view for patients and studies from the local hard disk drive (HDD) or a removable media.

1. Select a source from the ***Source*** drop-down list.
2. To search patients by using the searching filter, select a search method from the ***Search*** drop-down list. Or, you can manually enter a keyword in the search area.
3. Tap the desired patient from the list.
4. Use the following options:
   - **Image View**: View the saved images for the selected patient.
   - **Export**: Export the patient information.
   - **Save As**: Save the image as a different file format. The supported file formats are JPEG, BMP, DCM, AVI, and WMV.
   - **Send**: Send the saved images through the network.

Image View

Image View allows you to view the patient's images selected from the List View list. You can change the display layout.

To switch to Image View,

– Tap the desired patient on the list, and then tap **Image View**.

Figure 2-7 Image View display

Send

Send allows you to transfer patient(s) data to the DICOM device such as DICOM storage or DICOM Print.

To send from the local HDD to a DICOM device,

1. Tap the patient(s) from the patient list.
2. Tap **Send**. The dialog box appears.
3. Select the destination device from the drop-down list.
4. Tap **Send**. The progress bar appears during transferring files.

Export

To move patient information between compatible systems or to back up and retrieve, use Export menu. You can use the following types of media for performing data backup: USB HDD, USB flash drive.

NOTE

Make sure that your media is appropriate for exporting or importing images. If any problem occurs, eject the media and retry the task.

To export from the local HDD to a removable media,

1. Insert your removable media to the media tray properly.
2. If necessary, select **Local HDD** from the ***Source*** drop-down list.
3. Tap the patient(s) from the patient list.
4. Tap **Export**. The dialog box appears.
5. Select a media from the ***Device*** drop-down list.
6. You can enter the description such as information or comment.
7. When you have finished, tap **Yes**. The progress bar appears while exporting files.

To restore from a removable media to the local HDD,

1. Insert a media that contains patient data.
2. Select a removable media from the ***Source*** drop-down list.
3. Tap the patient(s) from the patient list.
4. Tap **Import**. The progress bar appears while importing files.

Save As

Save as allows you to export images or studies from your PC to a removable media, extension drive, and network storage. Before exporting, make sure that the removable media is placed in the right position.

To export images or studies to storage media,

1. Tap the patient(s) from the patient list.
2. Insert your removable media to the media tray properly.

   NOTE

   To configure the network storage, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Connectivity > General > Network Storage**.

3. Tap **Save As**. The dialog box appears.
4. Select a media from the ***Device*** drop-down list.
5. The system automatically creates a file name.
6. Select an image format in the ***Type*** field.
   To save Cine images as a video file, skip to step 9.

Table 2-7 Image format

Format	Function
DCM	Save a still image as standard DICOM format. It is possible to specify compression type and quality.
BMP	Save a still image as BMP format.
JPEG	Save a still image as JPEG format. It is possible to specify compression type and quality.

NOTE

To view a DICOM format image on your PC, you need a dedicated DICOM viewer.

7. If you selected **DCM** in step 6, select a compression type in the ***Compression*** field.
8. If you selected **JPEG** in step 6, select an image quality in the ***Quality*** field.
9. Select a video file format.
   - **2D Cine(*WMV)**: Save 2D Cine Images as WMV format.
10. When you have finished, tap **Save**. The progress bar appears during exporting files.

DICOM Spooler

DICOM spooler displays all DICOM transfers which have been sent or which have been failed.

You can view, resend, redirect, and delete images from the DICOM spooler by selecting a job, then specifying the action to be performed on this job.

NOTE

If you find a failed job(s) in the Spooler, please remove the failed job(s) from the Spooler.

To enter the DICOM spooler,

– Tap the Quick menu icon (▽) on the display, and then tap **Dicom Spooler**.

– On the ***Patient*** screen, tap **DICOM Spooler**.

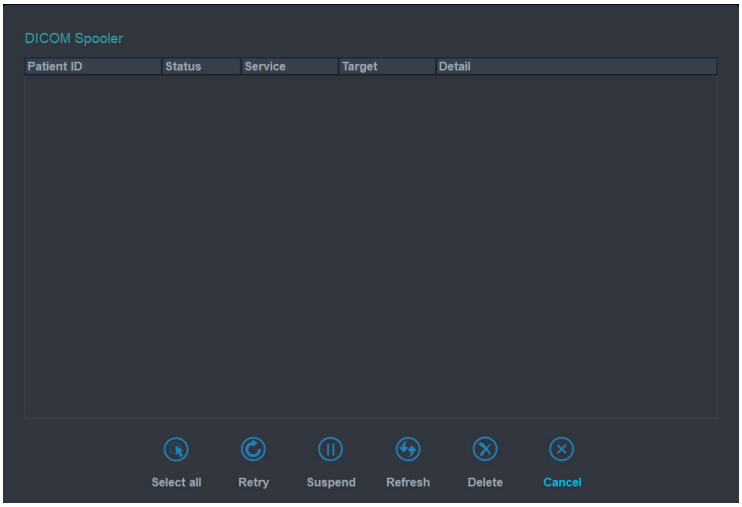


Figure 2-8 DICOM spooler

Table 2-8 DICOM job status description

Job status	Description
Hold	Job process is on hold.
Pending	Job is currently sending and the system is waiting for the server's response.
Active	Job is in progress.
Success	Job is sent successfully.
Failed	Job is failed to send. Tap **Retry** or **Delete** to complete the job.
Done	Job is finished successfully.

NOTE

When your system is connected to an MPPS* service, the following job status is available: In progress, Completed.

*Modality Performed Procedure Step (MPPS) is a DICOM service that enables you to notify the status information of a study to PACS.

Spooler options

On the DICOM spooler, you can use the following options:

Table 2-9 DICOM spooler options

Option	Description
Select All	Select all jobs in the DICOM spooler.
Retry	Resend a job that has failed or is in hold.
Suspend	Suspend the selected job.
Refresh	Update the information displayed at any time. The jobs that are done are removed from the spooler.
Delete	Delete non-active jobs.
Cancel	Exit the DICOM spooler.

Measurement and Report

Performing Measurements

To perform a measurement, tap **Meas**.

To use the calipers,

1. Tap and drag a caliper to the desired position, and release it.
2. Drag the caliper to the end point, and release it.

To delete a measurement,

1. Tap the result value you want to delete from the ***Result*** window. The caliper is activated.
2. Tap the Clear icon (✕) on the display.

To exit, tap **Meas**.

Measurement Display

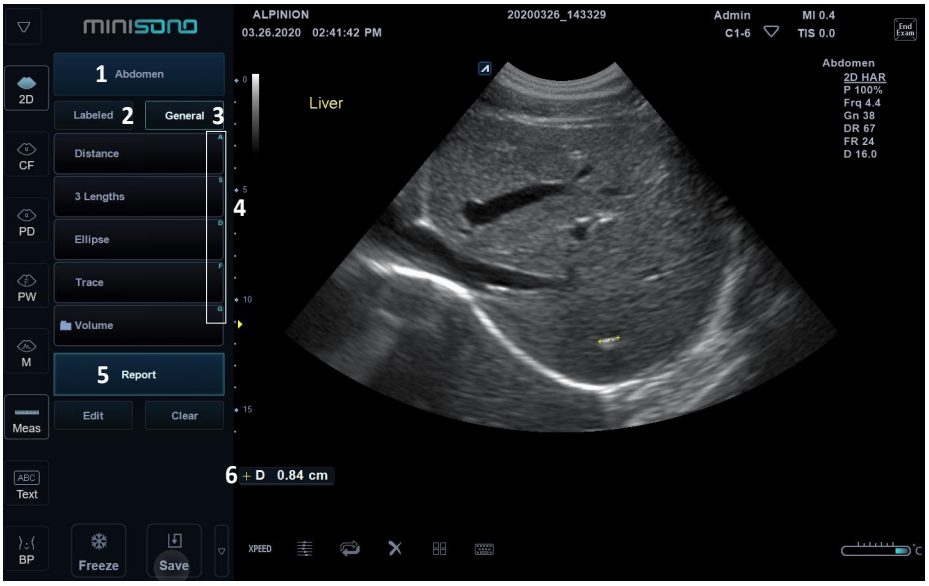


Figure 2-9 Measurement menu display

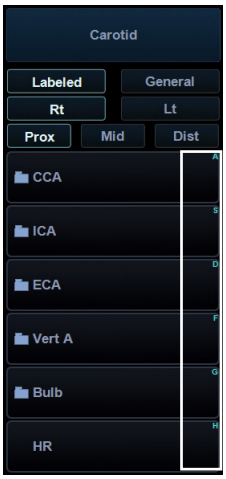
1	Measurement preset	**4**	Direct keys
2	Labeled measurement	**5**	Report
3	Basic measurement	**6**	Result window

Direct key

With the Direct key feature, you can quickly access measurement menus by simply pressing alphanumeric keys on the QWERTY keyboard. There are total of 16 available keys: A, S, D, F, G, H, J, K, L, Z, Y, C, V, B, N, M

1 Tap **Meas**.

2 From the labeled measurement menu, press an alphanumeric key to access the menu you want. You can see the corresponding direct key on the right side of the menu.



3 Repeat step 2 until the desired menu appears.

Basic Masurements

The basic measurement menus appear on the display. Displaying the list of basic measurement depends on an active preset and imaging mode.

To select a measurement parameter,

1. Select the desired measurement preset from the list.
2. Tap **General** on the display.
3. Select the desired measurement from the measurement list.

2D mode measurements

The basic 2D mode measurements include the following measurement parameters:

Distance

1. Tap **Distance**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the distance (**D**) is shown on the ***Result*** window.

Ellipse

1. Tap **Ellipse**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
3. Tap and drag the second caliper to the end point. The ellipse appears.
4. The measured value is fixed. The two diameters (**D1**, **D2**), the circumference (**C**), and the area (**A**) are shown on the ***Result*** window.

Trace

1. Tap **Trace**. The active caliper appears.
2. Tap and drag the caliper to the start point.
   The second caliper appears.
3. Tap and drag the second caliper gradually along the circumference of the target object.
4. The start point and the end point are connected with a line.
5. The measured value is fixed, and the circumference (**C**) and the area (**A**) are shown on the ***Result*** window.

Volume

1. Tap **Volume**. The active caliper appears.
2. Tap and drag the caliper to the start point.
   The first point is fixed, and the second caliper appears.
3. Tap and drag the second caliper to the second point.
   The first distance is measured.
4. Measure the second and third distances in the same manner.
   When the three distances are measured, the volume is calculated.
5. The measured value is fixed, and the three distances (**D1**, **D2**, **D3**) and the volume (**Vol**) are shown on the ***Result*** window.

A/B Ratio

1. Tap **A/B Ratio**. The active caliper appears.
2. Tap and drag the first caliper to measure the first diameter (**D1**) of the ratio.
3. Tap and drag the second caliper to measure the second diameter (**D2**) of the ratio.
4. The ratio is calculated, and the two distances (**D1**, **D2**) and A/B ratio (**A/B Ratio**) are shown on the ***Result*** window.

M mode measurements

The basic M mode measurements include the following measurement parameters:

Distance

1. Tap **Distance**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection. The start point is fixed, and the end point appears.
3. Tap and drag the point.
4. The measured value is fixed, and the distance (**D**) is shown on the ***Result*** window.

3 Lengths

1. Tap **Distance**. The active caliper appears.
2. Tap and drag the caliper to the start point.
3. Tap and drag the caliper to draw three straight lines.
4. The measured value is fixed, and three distances (**D1**, **D2**, **D3**) are shown on the ***Result*** window.

Time

1. Tap **Time**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears, and the time (**T**) is shown on the ***Result*** window.

Slope

1. Tap **Slope**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The oblique line is displayed, and the slope is calculated. The distance (**D**), time (**T**) and slope (**Slope**) are shown on the ***Result*** window.

A/B Ratio

1. Tap **A/B Ratio**. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first vertical diameter (**D1**) of the ratio.
3. Tap and drag the second caliper to measure the second vertical diameter (**D2**) of the ratio.
4. The ratio is calculated, and the two distances (**D1**, **D2**) and A/B ratio (**Distance Ratio**) are shown on the ***Result*** window.

D mode measurements

The basic D mode measurements include the following measurement parameters:

Velocity

1. Tap **Velocity**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection.
3. The measured value is fixed. The velocity (**Vel**) and pressure gradient (**PG**) are shown on the ***Result*** window.

Time

1. Tap **Time**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears, and the velocity (**Vel**) and time (**T**) are shown on the ***Result*** window.

Resistivity Index (RI)

1. Tap **RI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The end point is fixed, and the resistive index is calculated. The peak systolic velocity (**PS**), end diastolic velocity (**ED**), and resistivity index (**RI**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated. And the peak systolic velocity (**PS**), end diastolic velocity (**ED**), minimum diastolic velocity (**MD**), the maximum time-average velocity (**TAmax**), the resistivity index (**RI**), the pulsatility index (**PI**), and systole/diastole ratio (**S/D Ratio**) are shown on the ***Result*** window.

A/B Ratio

1. Tap **A/B Ratio**. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**V1**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**V2**) of the ratio.
4. The ratio is calculated. The two velocities (**V1**, **V2**) and A/B ratio (**Velocity Ratio**) are shown on the ***Result*** window.

Semi Auto Trace

1. In PW mode, select the desired measurement item.
2. Tap the measurement icon (), and then tap **Semi Auto Trace**.
   The active caliper appears.
3. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
4. Tap and drag the second caliper to trace one cycle of the waveform.
5. The measurement is completed, and the calculated value is shown on the ***Result*** window.

Abdomen

To select a package measurement,

1. Select the desired measurement preset from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

Aorta Diameter

1. Tap **AO**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the aorta diameter (**AO**) is shown on the ***Result*** window.

Renal Length

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Renal L**. The active caliper appears.
3. Tap and drag the first caliper to the start point.
4. The start point is fixed. The second caliper, overlapping the start point, appears.
5. Tap and drag the second caliper to the end point.
6. The measured value is fixed, and the renal length (**Rt** or **Lt Renal**) is shown on the ***Result*** window.

Renal Volume (1)

You can measure the length, width, and height for the left and right renal. Each measurement is a typical distance measurement made in appropriate scan plane.

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Renal** folder, and then select **Renal L**, **Renal H**, or **Renal W**.
   The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-c).
4. When the length, width, and height measurement is completed, the renal volume is calculated.
5. The measured value is fixed, and the renal volume (**Rt** or **Lt Renal Vol**) is shown on the ***Result*** window.

Renal Volume (2)

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Renal Vol**. The active caliper appears.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The first distance is measured.
5. Measure the second and third distances in the same manner.
   When three distances are measured, the volume is calculated.
6. The measured value is fixed, and the renal volume (**Rt** or **Lt Renal Vol**) is shown on the ***Result*** window.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

D mode measurements

Velocity (PS, ED, or MD)

1. Tap **PS**, **ED**, or **MD**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity (**PS**, **ED**, or **MD**) is shown on the ***Result*** window.

PS/ED or ED/PS Ratio

1. Tap **S/D** or **D/S**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**S** or **D**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**D** or **S**) of the ratio.
4. The ratio is calculated. The two velocities (**S**, **D**) and S/D or D/S ratio (**S/D** or **D/S**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated, and the pulsatility index (**PI**) is shown on the ***Result*** window.

Resistive Index (RI)

1. Tap **RI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The end point is fixed, and the resistive index is calculated. The resistivity index (**RI**) is shown on the ***Result*** window.

Maximum Time-Average Velocity (TAmax)

1. Tap **TAmax**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the caliper to the start point of the waveform.
   The end point appears.
3. Tap and drag the second caliper to trace the maximum values of the desired portion for the spectrum.
4. The maximum time-average is calculated. The maximum time-average (**TAmax**) is shown on the ***Result*** window.

Acceleration (Accel)

1. Tap **Accel**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The oblique line is displayed and the acceleration is calculated. The acceleration (**Accel**) and the acceleration time (**AT**) are shown on the ***Result*** window.

Acceleration Time (AT)

1. Tap **AT**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears. The acceleration time (**AT**) is shown on the ***Result*** window.

Obstetrics

To select a package measurement,

1. Select the desired measurement preset from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

Gestational Sac (GS)

1. Tap **GS**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the gestational sac length (**GS**) is shown on the ***Result*** window.

Abdominal Circumference (AC)

1. Tap **AC**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point. The ellipse appears.
5. The measured value is fixed, and the abdominal circumference (**AC**) is shown on the ***Result*** window.

NOTE

You can measure the abdominal circumference by using the trace. To change the measurement method, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Measurement** > **Labeled MEAS.** > **OB** > **2D** > **AC** > **Edit** > **Caliper Type**.

Biparietal Diameter (BPD)

1. Tap **BPD**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the biparietal diameter (**BPD**) is shown on the ***Result*** window.

Head Circumference (HC), Occipito-frontal Diameter (OFD)

1. Tap **HC**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point. The ellipse appears.
5. The measured value is fixed. The head circumference (**HC**) and the occipito-frontal diameter (**OFD**) are shown on the ***Result*** window.

Amniotic Fluid Index (AFI)

To calculate the amniotic fluid index, measure the four quadrants of the uterine cavity.

1. Select the **AFI** folder, and then select **AFI-Q1**.
   The active caliper appears.
2. Perform 1 Distance measurement.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
   d. The first quadrant measurement is completed, and The AFI sum for AFI-Q1 is automatically shown on the ***Result*** window.
3. Repeat step 2 to measure the second, third, and fourth quadrant (AFI-Q2, AFI-Q3, AFI-Q4).
4. The total sum of your AFI measurements is shown on the ***Result*** window.

Antero-Postero Trunk Diameter by Transverse Trunk Diameter (AxT)

1. Tap **AxT**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
   d. The antero-postero trunk diameter (**APTD**) measurement is completed.
2. Perform the measurement of the transverse trunk diameter (**TTD**) measurement in the same manner (a-d).
3. When two distance measurements are completed, the measured value is shown on the ***Result*** window.

CTAR

1. Tap **CTAR**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point. The ellipse appears.
   d. The heart area (**Heart Area**) measurement is completed.
2. Perform the thoracic area (**Thorax Area**) measurement in the same manner (a-d).
3. When two ellipse measurements are completed, the measured value is shown on the ***Result*** window.

NOTE

The cardiothoracic area ratio measurement is available for the OB1 preset and OB2/3 presets (CTAR), and Fetal Echo preset (CT).

Femur Length (FL)

1. Tap **FL**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the femur length (**FL**) is shown on the ***Result*** window.

Spinal Length (SL)

1. Tap **SL**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the length of vertebrae (**SL**) is shown on the ***Result*** window.

Left Ventricle – Teichholz Method

The followings are Teichholz measurements:

- **Teichholz – IVSd, LVIDd, LVPWd, IVSs, LVIDs, LVPWs**

1. Select the **Teichholz** folder.
2. Select a Teichholz measurement. The active caliper appears.
   a. Tap and drag the first caliper to the interventricular septum.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point. A straight line appear on the display.
   d. The first distance (**IVSd** or **IVSs**) measurement is completed.
3. Perform the measurement of the second (**LVIDd** or **LVIDs**) and third (**LVPWd** or **LVPWs**) distance in the same manner (a-d).
4. When three length measurements are completed, the left ventricle dimension is shown on the ***Result*** window.

NOTE

When you select **Diastole** or **Systole**, you can perform the 3 Lengths measurement with a straight line. Otherwise, when you select **IVS**, **LVID**, or **LVPW**, you can only perform 1 Distance measurement.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

Diameter

The followings are distance measurements:

- **Heart – LA Diam, Ao Diam, RADs, RADd, RVAWd, RVAWs, RV Diam, PA Diam**

1. Select the **Heart** folder.
2. Select a distance measurement. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
3. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
4. Tap and drag the end point of intersection.
5. The measured value is fixed, and the distance measurement is shown on the ***Result*** window.

Time

The followings are time measurements:

- **Heart – LVET, RVET**

1. Select the **Heart** folder.
2. Select a distance measurement. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
3. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
4. Tap and drag the end point of intersection.
5. The time interval between the two points appears. The time measurement is shown on the ***Result*** window.

Slope

The followings are distance measurements:

- **Heart – DE Amp Slope, EF Slope**

1. Select the **Heart** folder.
2. Select **DE Amp Slope** or **EF Slope**. The active caliper appears.
   The vertical line and the horizontal line are perpendicular to each other.
3. Tap and drag the point of intersection.
   The start point is fixed, and the end point appears.
4. Tap and drag the end point of intersection.
5. When the oblique line appears, the slope is calculated. The slope measurement is shown on the ***Result*** window.

Left Ventricle – Teichholz Method

The followings are Teichholz measurements:

- **Teichholz – IVSd, LVIDd, LVPWd, IVSs, LVIDs, LVPWs**

1. Select the **Teichholz** folder.
2. Select a Teichholz measurement. The active caliper appears.
   a. Tap and drag the start point to the interventricular septum.
   b. The start point is fixed, and the end point appears.
   c. Tap and drag the end point. A straight line appears on the display.
   d. The first distance (**IVSd** or **IVSs**) measurement is completed.
3. Perform the measurement of the second (**LVIDd** or **LVIDs**) and third (**LVPWd** or **LVPWs**) distance in the same manner (a-d).
4. When three length measurements are completed, the left ventricle dimension is shown on the ***Result*** window.

NOTE

When you select **Diastole** or **Systole**, you can perform the 3 Lengths measurement with a straight line. Otherwise, when you select **IVS**, **LVID**, or **LVPW**, you can only perform 1 Distance measurement.

D mode measurements

Peak Systole, End Diastole or Minimum Diastole (PS, ED, or MD)

1. Tap **PS**, **ED**, or **MD**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity (**PS**, **ED**, or **MD**) is shown on the ***Result*** window.

PS/ED or ED/PS Ratio

1. Tap **S/D** or **D/S**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**S** or **D**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**D** or **S**) of the ratio.
4. The ratio is calculated. The two velocities (**S**, **D**) and S/D or D/S ratio (**S/D** or **D/S**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated, and the pulsatility index (**PI)** is shown on the ***Result*** window.

Resistive Index (RI)

1. Tap **RI**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The resistive index is calculated, and the resistivity index (**RI**) is shown on the ***Result*** window.

Maximum Time-Average Velocity (TAmax)

1. Tap **TAmax**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the caliper to the start point of the waveform.
   The end point appears.
3. Tap and drag the second caliper to trace the maximum values of the desired portion for the spectrum.
4. The maximum time-average is calculated, and the maximum time-average (**TAmax**) is shown on the ***Result*** window.

Acceleration (Accel)

1. Tap **Accel**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. When the oblique line appears, the acceleration is calculated. The acceleration (**Accel**) and the acceleration time (**AT**) are shown on the ***Result*** window.

Acceleration Time (AT)

1. Tap **AT**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears. The acceleration time (**AT**) is shown on the ***Result*** window.

Velocity

The followings are velocity measurements:

- **Valves – MV E pt, MV A pt, AV Vmax, PV Vmax, FO**
- **Arteries – Asc. aorta Vmax, Thor. aorta Vmax, Trans. ao. arch Vmax, DA Vmax, PA Vmax, Umb. A Vmax**
- **Veins – SVC Vmax, IVC Vmax, Lt. PV Vmax, Rt. PV Vmax, Umb. V Vmax**

1. Select the package measurement folder, and then select the desired velocity measurement.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity is shown on the ***Result*** window.

Time

The followings are time measurements:

- **Ventricles – IVCT, LVET, IVRT, RVET**

1. Select the package measurement folder, and then select the desired time measurement.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears. The time measurement is shown on the ***Result*** window.

Gynecology

To select a package measurement,

1. Select the desired measurement preset from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

Endometrium Thickness

1. Tap **Endo Thick.**. The active caliper appears.
2. Tap and drag the first caliper to the start point.
3. The start point is fixed. The second caliper, overlapping the start point, appears.
4. Tap and drag the second caliper to the end point.
5. The measured value is fixed, and the endometrium thickness (**Endo Thick.**) is shown on the ***Result*** window.

Follicle Volume

You can make the ovary follicle volume from one, two, or three distance measurements.

1 Distance Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Follicle** folder. The active caliper appears.
3. Tap and drag the first caliper to the start point.
4. The start point is fixed. The second caliper, overlapping the start point, appears.
5. Tap and drag the second caliper to the end point.
6. The measured value is fixed, and the follicle volume (**Rt** or **Lt Fo-Vol**) is shown on the ***Result*** window.

2 Distances Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Follicle** folder. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second distance in the same manner (a-c).
4. When two distances are measured, the volume is calculated.
5. The measured value is fixed, and the follicle volume (**Rt** or **Lt Fo-Vol**) is shown on the ***Result*** window.

3 Distances Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Follicle** folder. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-c).
   When three distances are measured, the volume is calculated.
4. The measured value is fixed, and the follicle volume (**Rt** or **Lt Fo-Vol**) is shown on the ***Result*** window.

NOTE

To configure the follicle volume method, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Measurement** > **Labeled MEAS.** > **Follicle** > **Edit**.

Ovary Volume (1)

You can measure the length, width, and height for the left and right ovaries. Each measurement is a typical distance measurement made in appropriate scan plane.

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Ovary** folder, and then select **Ovary L**, **Ovary W**, or **Ovary H**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-c).
4. The measured value is fixed, and the ovary volume (**Rt** or **Lt Ovary Vol**) is shown on the ***Result*** window.

Ovary Volume (2)

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Ovary Vol**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-c).
4. The measured value is fixed, and the ovary volume (**Rt** or **Lt Ovary Vol**) is shown on the ***Result*** window.

NOTE

To configure the ovary volume method, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Measurement** > **Labeled MEAS.** > **Ovary Vol** > **Edit**.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

D mode measurements

Peak Systole, End Diastole or Minimum Diastole (PS, ED, or MD)

1. Tap **PS**, **ED**, or **MD**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity (**PS**, **ED**, or **MD**) is shown on the ***Result*** window.

PS/ED or ED/PS Ratio

1. Tap **S/D** or **D/S**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**S** or **D**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**D** or **S**) of the ratio.
4. The ratio is calculated. The two velocities (**S**, **D**) and S/D or D/S ratio (**S/D** or **D/S**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated, and the pulsatility index (**PI)** is shown on the ***Result*** window.

Resistive Index (RI)

1. Tap **RI**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The resistive index is calculated, and the resistivity index (**RI**) is shown on the ***Result*** window.

Maximum Time-Average Velocity (TAmax)

1. Tap **TAmax**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the caliper to the start point of the waveform.
   The end point appears.
3. Tap and drag the second caliper to trace the maximum values of the desired portion for the spectrum.
4. The maximum time-average is calculated, and the maximum time-average (**TAmax**) is shown on the ***Result*** window.

Acceleration (Accel)

1. Tap **Accel**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. When the oblique line appears, the acceleration is calculated. The acceleration (**Accel**) and the acceleration time (**AT**) are shown on the ***Result*** window.

Acceleration Time (AT)

1. Tap **AT**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points appears. The acceleration time (**AT**) is shown on the ***Result*** window.

Vascular

To select a package measurement,

1. Select the desired measurement preset from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

%Stenosis (Diameter)

1. Tap **%Steno(Diam)**. The active caliper appears.
2. Tap and drag the first caliper to measure the larger diameter (**D1**) of the stenosis.
3. Tap and drag the second caliper to measure the smaller diameter (**D2**) of the stenosis.
4. The two diameters percent stenosis (**%Steno(Diam)**) are automatically shown on the ***Result*** window.

%Stenosis (Area)

1. Tap **%Steno(Area)**. The active caliper appears.
2. Tap and drag the first caliper to measure the outer area (**A1**) of the stenosis.
3. Tap and drag the second caliper to measure the inner area (**A2**) of the stenosis.
4. The two diameters percent stenosis (**%Steno(Area)**) are automatically shown on the ***Result*** window.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

D mode measurements

Velocity

1. Select a labeled measurement for velocity. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity is shown on the ***Result*** window.

PS/ED Ratio

1. Tap **S/D**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**S**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**D**) of the ratio.
4. The ratio is calculated. The two velocities (**S**, **D**) and S/D ratio (**S/D**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated, and the pulsatility index (**PI**) is shown on the ***Result*** window.

Resistive Index (RI)

1. Tap **RI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The end point is fixed, and the resistive index is calculated. The resistivity index (**RI**) is shown on the ***Result*** window.

Maximum Time-Average Velocity (TAmax)

1. Tap **TAmax**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The end point appears.
3. Tap and drag the second caliper to trace the maximum values of the desired portion for the spectrum
4. The maximum time-average is calculated. The maximum time-average (**TAmax**) is shown on the ***Result*** window.

Pediatrics

To select a package measurement,

1. Select the desired measurement application from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

Renal Volume (1)

You can measure the length, width, and height of the left and right renal. Each measurement is a typical distance measurement made in the appropriate scan plane.

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Renal** folder, and then select **Renal L**, **Renal H**, or **Renal W**.
   The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-d).
4. When the length, width, and height measurement is completed, the renal volume is calculated.
5. The measured value is fixed, and the renal volume (**Rt** or **Lt Renal Vol**) is shown on the ***Result*** window.

Renal Volume (2)

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Renal Vol**. The active caliper appears.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The first distance is measured.
5. Measure the second and third distances in the same manner.
   When three distances are measured, the volume is calculated.
6. The measured value is fixed, and the renal volume (**Rt** or **Lt Renal Vol**) is shown on the ***Result*** window.

Hip Joint (BA)

The hip angle (α, β) between three lines is calculated. The first line is the baseline. The second line establishes the beta angle (β). The third line establishes the alpha angle (α).

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Hip** folder, and then select **Hip(BA)**.
   The first distance measurement (baseline) is already selected.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The baseline is completed.
5. Perform the measurement for the second (β) and third (α) distances.
6. When all of the three lines are measured, the hip angle is calculated.
7. The measured value is fixed. The hip angles (**Rt** or **Lt**, **Alpha** and **Beta**) are shown on the ***Result*** window.

Hip Joint (AB)

The hip angle (α, β) between three lines is calculated. The first line is the baseline. The second line establishes the alpha angle (α). The third line establishes the beta angle (β).

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Hip** folder, and then select **Hip(AB)**.
   The first distance measurement (baseline) is already selected.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The baseline is completed.
5. Perform the measurement for the second (α) and third (β) distances.
6. When all of the three lines are measured, the hip angle is calculated.
7. The measured value is fixed. The hip angles (**Rt** or **Lt**, **Alpha** and **Beta**) are shown on the ***Result*** window.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

D mode measurements

Peak Systole, End Diastole or Minimum Diastole (PS, ED, or MD)

1. Tap **PS**, **ED**, or **MD**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
3. The measured value is fixed, and the velocity (**PS**, **ED**, or **MD**) is shown on the ***Result*** window.

PS/ED or ED/PS Ratio

1. Tap **S/D** or **D/S**.
   The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to measure the first point (**S** or **D**) of the ratio.
3. Tap and drag the second caliper to measure the second point (**D** or **S**) of the ratio.
4. The ratio is calculated. The two velocities (**S**, **D**) and S/D or D/S ratio (**S/D** or **D/S**) are shown on the ***Result*** window.

Pulsatility Index (PI)

1. Tap **PI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the first caliper to the start point of the waveform.
   The second caliper appears.
3. Tap and drag the second caliper to manually trace the waveform.
4. The pulsatility index is calculated, and the pulsatility index (**PI**) is shown on the ***Result*** window.

Resistive Index (RI)

1. Tap **RI**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The end point is fixed, and the resistive index is calculated. The resistivity index (**RI**) is shown on the ***Result*** window.

Maximum Time-Average Velocity (TAmax)

1. Tap **TAmax**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag the caliper to the start point of the waveform.
   The end point appears.
3. Tap and drag the second caliper to trace the maximum values of the desired portion for the spectrum.
4. The maximum time-average is calculated. The maximum time-average (**TAmax**) is shown on the ***Result*** window.

Acceleration (Accel)

1. Tap **Accel**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The oblique line is displayed and the acceleration is calculated. The acceleration (**Accel**) and the acceleration time (**AT**) are shown on the ***Result*** window.

Acceleration Time (AT)

1. Tap **AT**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The time interval between the two points is displayed. The acceleration time (**AT**) is shown on the ***Result*** window.

Small Parts

To select a package measurement,

1. Select the desired measurement preset from the list.
2. Tap **Labeled** on the display.
3. Select a package measurement folder.
4. Select the desired measurement from the measurement list.

2D mode measurements

Thyroid Volume (1)

You can measure the length, width, and height for the left and right thyroid. The each measurement is a typical distance measurement made in the appropriate scan plane.

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Thyroid** folder, and then select **Thyroid L**, **Thyroid H**, or **Thyroid W**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-d).
4. When the length, width, and height measurements are completed, the thyroid volume is calculated.
5. The measured value is fixed, and the thyroid volume (**Rt** or **Lt Thyroid Vol**) is shown on the ***Result*** window.

Thyroid Volume (2)

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Thyroid Vol**. The active caliper appears.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The first distance is measured.
5. Measure the second and third distances in the same manner.
6. When three distances are measured, the volume is calculated.
7. The measured value is fixed, and the thyroid volume (**Rt** or **Lt Thyroid Vol**) is shown on the ***Result*** window.

Testicle Volume (1)

You can measure the length, width, and height of the scrotum. Length is measured in the sagittal plane. Width and height are measured in the axial plane.

1. Tap **Rt** (right) or **Lt** (left).
2. Select the **Testicle** folder, and then select **Testicle L**, **Testicle H**, or **Testicle W**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-d).
4. When the length, width, and height measurements are completed, the testicle volume is calculated.
5. The measured value is fixed, and the testicle volume (**Rt** or **Lt Testicle Vol**) is shown on the ***Result*** window.

Testicle Volume (2)

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Testicle Vol**. The active caliper appears.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The first distance is measured.
5. Measure the second and third distances in the same manner.
6. When three distances are measured, the volume is calculated.
7. The measured value is fixed, and the testicle volume (**Rt** or **Lt Testicle Vol**) is shown on the ***Result*** window.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated.
5. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

Musculoskeletal (MSK)

2D mode measurements

Volume

You can make the volume from one, two, or three distance measurements.

1 Distance Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Volume**. The active caliper appears.
3. Tap and drag the first caliper to the start point.
4. The start point is fixed. The second caliper, overlapping the start point, appears.
5. Tap and drag the second caliper to the end point.
6. The measured value is fixed, and the volume (**Rt** or **Lt Vol**) is shown on the ***Result*** window.

2 Distances Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Volume**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second distance in the same manner (a-d).
4. When two distances are measured, the volume is calculated.
5. The measured value is fixed, and the volume (**Rt** or **Lt Vol**) is shown on the ***Result*** window.

3 Distances Volume

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Volume**. The active caliper appears.
   a. Tap and drag the first caliper to the start point.
   b. The start point is fixed. The second caliper, overlapping the start point, appears.
   c. Tap and drag the second caliper to the end point.
3. Perform the measurement of the second and third distance in the same manner (a-d).
4. When three distances are measured, the volume is calculated.
5. The measured value is fixed, and the volume (**Rt** or **Lt Vol**) is shown on the ***Result*** window.

Hip(BA)

The hip angle (α, β) between three lines is calculated. The first line is the baseline. The second line establishes the beta angle (β). The third line establishes the alpha angle (α).

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Hip(BA)**. The first distance measurement (baseline) is already selected.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The baseline is completed.
5. Perform the measurement for the second (β) and third (α) distances.
6. When all of the three lines are measured, the hip angle is calculated.
7. The measured value is fixed, and the hip angles (**Rt** or **Lt**, **Alpha** and **Beta**) are shown on the ***Result*** window.

Hip(AB)

The hip angle (α, β) between three lines is calculated. The first line is the baseline. The second line establishes the alpha angle (α). The third line establishes the beta angle (β).

1. Tap **Rt** (right) or **Lt** (left).
2. Tap **Hip(AB)**. The first distance measurement (baseline) is already selected.
3. Tap and drag the the first caliper to the start point.
   The first point is fixed, and the second caliper appears.
4. Tap and drag the second caliper to the second point.
   The baseline is completed.
5. Perform the measurement for the second (α) and third (β) distances.
6. When all of the three lines are measured, the hip angle is calculated.
7. The measured value is fixed. The hip angles (**Rt** or **Lt**, **Alpha** and **Beta**) are shown on the ***Result*** window.

M mode measurements

Heart Rate (HR)

1. Tap **HR**. The vertical line and the horizontal line are perpendicular to each other.
2. Tap and drag to the point of intersection.
   The start point is fixed, and the end point appears.
3. Tap and drag the end point of intersection.
4. The heart rate between the two points is calculated. The heart rate (**HR**) and time (**T**) are shown on the ***Result*** window.

Report

The reports summarize the data obtained during the examination.

Saved reports are read-only. Therefore it is recommended that the data is carefully reviewed before the report is saved. Use the worksheet to facilitate the review and adjustment of data before generating a report. The completed report can be printed on a standard printer.

Report display

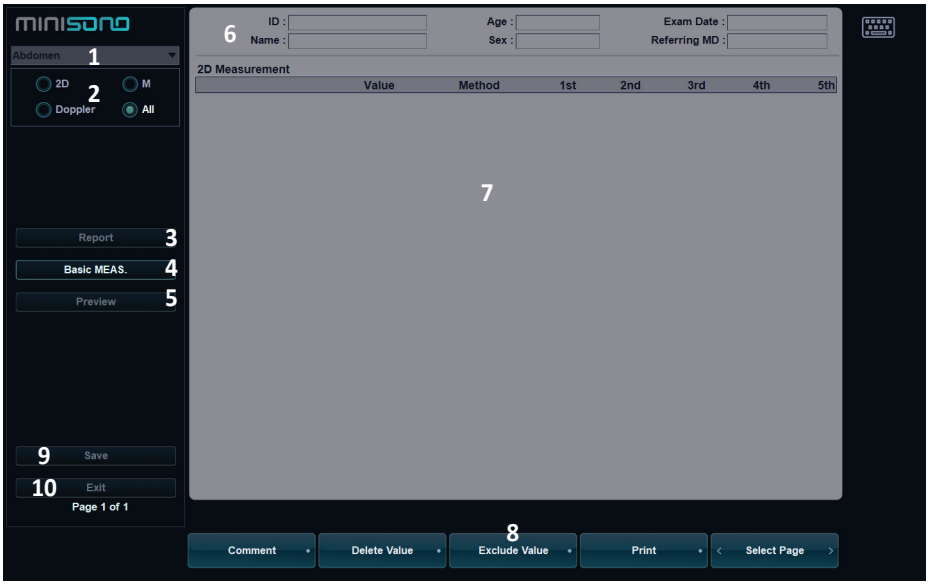


Figure 2-10 Report display

1	Application selection	**6**	Patient information
2	Imaging mode selection	**7**	Measurement information
3	Report	**8**	Report controls
4	Basic measurement report	**9**	Save
5	Preview	**10**	Exit

The following table describes available Report controls.

Table 2-10 Report controls

Controls	Description
Application selection	Select an application to view a report by application.
Imaging mode selection	• 2D/M/Doppler: View a report in a particular mode (2D, M, or Doppler). • All: View a report for more than one mode.
Report	Access Worksheet page.
Basic MEAS.	View a report of basic measurement.
Preview	Preview the report in print format.
Graph	Access OB Graph page (applies only to OB).
Anatomical Survey	Access Anatomical Survey page (applies only to OB).
Fetus Compare	Compare between fetuses by viewing measurement and calculation values.
Comment	View or edit comments.
Delete Value	Delete measurement results.
Exclude Value	Exclude or include measurement results.
Print	Print out the report to the default printer.
Select Page	View the next page of the report.
Save	Capture the current report screen.
Exit	Exit Report page.

Report operations

Viewing a report

1. Tap **Report**. Or tap the Quick menu icon (▽) on the display, and then tap **Report**. You can view a report for the current study.
2. To view a report of basic measurement, tap **Basic MEAS.**.
3. To view a report by application or measurement mode, select an application or a mode from the corresponding list or field on the top left of the display.
   - To view a report in a particular mode, select a mode (**2D**, **M**, or **Doppler**) on the top of the display.
   - To view a report for more than one mode, tap **All**.
4. When a report appears on the display, view the report information.
5. To view the next page of the report, tap **Select Page**.
6. To exit the report, tap **Exit**.

Editing a report

To change the report data,

1. Tap the field that you want to change. The field is highlighted.
2. Enter a new data. You can enter data in the blank field.
   The entered data is changed to green and changed data is shown with an asterisk mark.

To erase measurement results,

1. Tap the field that that you want to erase. The field is highlighted.
2. Tap **Delete Value** to delete the data.

To exclude or include measurement results,

1. Tap the field that you want to exclude. The field is highlighted.
2. Tap **Exclude Value** to exclude the data. The excluded data is displayed in white.
3. Tap **Exclude Value** again to include the data that you previously excluded.

To change the value type,

1. Tap the **Method** column.
2. Select a value type of the measurement (**Last**, **Aver**, **Max**, or **Min**) from the drop-down list .

Adding a comment

1. Tap **Comment**. You can view comments in the ***Comments*** screen.
2. On the ***Comments*** screen, enter text by using the virtual keyboard.
3. To exit the comment, tap **OK**.

Previewing a report

To preview the report,

– Tap **Preview**. You can preview a report to be printed.

To export the report in PDF,

1. Tap **PDF Export**. The dialog box appears.
2. Select a media from the ***Device*** field.
3. Enter a file name in the ***File Name*** field.
4. Tap **Save**. The progress bar appears during exporting files.

Capturing a report page

To capture the report screen, tap **Save**.

OB report

The OB report has three sections of information:

- Patient information
- Measurement information
- Calculation information

Patient information

- **ID**
- **Name**
- **Age**
- **Exam date**
- **Referring MD**
- **LMP** or **IVF**
- **GA(LMP)** or **GA(IVF)**, **EDD(LMP)** or **EDD(IVF)**
- Determined from LMP or IVF data
- **GA(AUA)** or **GA(CUA)**, **EDD(AUA)** or **EDD(CUA)**: If this field is checked, the system uses the measurement to calculate the ultrasound age.
  - AUA: Average Ultrasound age, regression calculation
  - CUA: Composite Ultrasound age, an arithmetric average
- **Fetus**: For a multi-gestational patient, select a fetus (A, B, C, D) in this field.

NOTE

To edit the patient information, go to ***Patient*** screen.

Measurement information

- **Value**: The measured value. If more than one measurement was made for an item, the system uses the specified method (average, maximum, minimum, or last) to determine this value. See also "Editing a report" on page 2-84.
- **1st–3rd**: The three measurement values for each item are available. If you make more than three measurements, the report uses the last three.
- **GA**: GA is calculated based on the measured values for the fetus. “##” appears when any of the values is out of range.
- **GP**: The growth percentile of each measurement. The GP value is calculated by selecting LMP and AUA.
- **Range**: The typical range of fetal age for this measurement.

  NOTE

  The GA range may not be shown when the range of OB reference (author) is set to none (unavailable).

- **Method**: This specifies the method used to calculate the measurement value listed in the value column. The method options are **Last**, **Aver**, **Max**, or **Min**.

NOTE

To configure the default method for the measurement value, tap the Quick menu icon (▽) on the display, and then tap **System Preset**. Go to **Measurement** > **Labeled MEAS.** > **Edit** > **Method**.

Calculation information

- **EFW**: Show the parameters used to calculate EFW. This is followed by the calculation result.
- **EFW GP**: Show the source used to calculate EFW GP. This is followed by the growth percentile. When you enter LMP, you can check the EFW GP value and reference (Hadlock, Brenner, Williams, Pittaluga).
- **Ratio**: The remaining calculation information shows ratios for several measurements.
- **CI** (Cephalic index): The value calculated by measuring BPD and OFD is displayed.
  - AC/HC
  - FL/BPD
  - FL/HC
  - FL/AC
- **EFW Range**: The GP value is calculated by selecting LMP and AUA.

OB graph

The OB graph shows curve graphs and bar graphs that indicate predicate fetal growth patterns according to the selected reference (author) for a measurement or calculation.

OB graph allows you to access the fetal growth curve compared to a normal growth curve. When a patient has completed data from the previous studies, you can use the graph to look at fetal trending.

For multi-gestational patients, you can compare the growth on the graphs.

Fetal growth – references

Table 7-19 Fetal growth (reference)

Display item name	Description	Reference (Author) name
EFW	Estimated Fetal Weight	Brenner, Doubilet, Hadlock, Hansmann, Hansmann 86, Hobbins/ Persutte, JSUM2001, Osaka, Persson Tokyo/Shinozuka, Tokyo, Williams, Yarkoni, Kiserud, EIK-NE2007, Marsal, Pittaluga
AC	Abdominal Circumference	ASUM, CFEF, Chitty, Hadlock, Hansmann, Jeanty, JSUM, Kurmanavicius, Lessoway, Merz, Nicolaides, Shinozuka, Tokyo, Kiserud, Verburg
AFI	Amniotic Fluid Index	Moore
APAD	Anteroposterior Abdominal Diameter	Merz
APTD	Anteroposterior Trunk Diameter	Hansmann
AxT	Anteroposterior Trunk Diameter multiplied by Transverse Trunk Diameter	Shinozuka, Tokyo
BOD	Binocular Distance	Jeanty
BPD	Biparietal Diameter	ASUM, CFEF, Chitty, Hadlock, Hansmann, Jeanty, JSUM, Kurmanavicius, Lessoway, Marsal, Merz, Nicolaides, Osaka, Sabbagha, Shinozuka, Tokyo, EIK-NES 2007, Kiserud, Verburg
CLAV	Clavicle Length	Yarkoni

Display item name	Description	Reference (Author) name
CM	Cisterna Magna	Nicolaides
CRL	Crown-Rump Length	ASUM, Hadlock, Hansmann, JSUM, Marsal, Osaka, Robinson, Shinozuka, Tokyo
FL	Femur Length	ASUM, CFEF, Chitty, Hadlock, Hansmann, Jeanty, JSUM, Kurmanavicius, Lessoway, Marsal, Merz, Nicolaides, O'Brien, Osaka, Shinozuka, Tokyo, Warda, EIK-NES 2007, Kiserud, Verburg
FTA	Fetal Trunk Cross-Sectional Area	Osaka
Fibula	Fibula Length	Jeanty
GS	Gestation Sac Length	Hellman, Rempen
HC	Head Circumference	ASUM, CFEF, Chitty, Hadlock, Hansmann, Jeanty, Kurmanavicius, Lessoway, Merz, Nicolaides, Kiserud, Verburg
Humerus	Humerus Length	ASUM, Jeanty, Merz, Osaka
SL	Spinal Length	Tokyo
MCA PI	Middle Cerebral Artery Pulsatility Index	Bahlman, JSUM, Schaffer
MCA PS	Middle Cerebral Artery Peak Systole Velocity	Mari
MCA RI	Middle Cerebral Artery Resistive Index	Bahlman, JSUM, Schaffer
MAD	Middle Abdomen Diameter	EIK-NES, Kurmanavicius, EIK-NES 2007, Kiserud
MSD	Mean Gestational Sac Diameter	Hellman, Rempen
OFD	Occipito-frontal Diameter	ASUM, Hansmann, Jeanty, Kurmanavicius, Merz, Nicolaides
Radius	Radius Length	Jeanty, Merz
TAD	Transverse Abdominal Diameter	CFEF, Merz
CEREB	Transverse Cerebellar Diameter	GoldStein, Hill, Nicolaides, Verburg
Tibia	Tibia Length	Jeanty, Merz

Display item name	Description	Reference (Author) name
TTD	Transverse Trunk Diameter	Hansmann
Ulna	Ulna Length	Jeanty, Merz
UmbArt PI	Umbilical Artery Pulsatility Index	JSUM, Merz, Schaffer
UmbArt RI	Umbilical Artery Resistive Index	JSUM, Kurmanavicius, Merz, Schaffer
AO PI	Aorta Pulsatility Index	Schaffer
AO RI	Aorta Resistive Index	Schaffer
Uterine A PI	Uterine Artery Pulsatility Index	Schaffer
Uterine A RI	Uterine Arte Resistive Index	Schaffer
CI	Cephalic Index	Hadlock
HC/AC	HC and AC ratio Ratio of Head Circumference to Abdominal Circumference	Campbell
FL/BPD	Ratio of Femur Length to Biparietal Diameter	Hohler, Kiserud
FL/AC	Ratio of Femur Length to Abdominal Circumference	Hadlock
FL/HC	Ratio of Femur Length to Head Circumference	Hadlock

Fetal growth curve graphs

To start a curve graph,

1 Tap **Report.** Or tap the Quick menu icon (▽) on the display, and then tap **Report**. You can view a report for the current study.

2 Tap **Graph**. The fatel growth curve graph appears.

To view a curve graph,

Figure 2-11 Curve graph

- The horizontal axis shows the fetal age in weeks. This age is determined by the entry data on the ***Patient*** screen. The vertical axis shows one of the followings:
  - For measurements: mm or cm
  - For ratios: percent
  - For fetal weight: gram
- The fetal growth graph shows the following information for the selected measurement:
  - The normal fetal growth curve
  - The standard deviations or relevant percentiles
  - The gestational age of the fetus, using patient data and ultrasound age (vertical dotted line)
  - The current ultrasound measurement data, where the fetus is on the growth curve (symbol)

- On the left of the fetal growth graph, the following additional information appears:
  - **GA(AUA)** or **GA(CUA)**: The system allows you to use the composite ultrasound age (CUA) or average ultrasound age (AUA). Tap **Select AUA/CUA** to select a gestational age.
  - **GA(LMP)** or **GA(IVF)**: This data is determined by the LMP (or IVF) data on the ***Patient*** screen.
  - **GA**: This data is calculated based on the measured values for the fetus.

Fetal growth bar graphs

To start a bar graph,

– While viewing the OB graph, tap **Bar**.

To view a curve graph,

– The horizontal axis shows the gestational weeks.

– The blue vertical line shows the gestational age (GA) by the LMP data.

– The blue dotted vertical line shows the CUA (or AUA) by the current measured values.

– To select a gestational age, tap **Select AUA/CUA**.

– The yellow symbol mark (+) shows the ultrasound GA for each measurement.

– The blue rectangle shows the normal age range for the measurement.

NOTE

You cannot view the fetal trending or multiple fetus data on the bar graph.

Anatomical Survey

Figure 2-12 Anatomical Survey

To start the anatomical survey,

– While viewing the OB report, tap **Anatomical Survey**.

NOTE

The patient specific contents input on the ***Anatomical Survey*** page are returned to the factory default settings after starting a new patient.

To set all values in the list as default, tap **Default**.

To clear all values in the list, tap **Clear**.

To edit the lists in anatomical survey, tap the descriptive data field to place the cursor. You can enter the anatomy name.

To save the data as default, tap **Save As Default**.

To set the anatomical survey list as default, tap **Factory Default**.

To clear all input data in the option fields, tap **Clear All**.

Fetus Compare

You can compare between fetuses by viewing measurement and calculation values. While viewing the OB report, tap **Fetus Compare**. The measurement and calculation values for each fetus are shown on the display.

Figure 2-13 Fetus Compare

Measurement accuracy

The measurement values should always be accurate according to measuring caliper and point.

Despite the high technical accuracy of the scan geometry and the measuring system of the minisono expert equipment, one must, however, be aware of inaccuracies caused by the ultrasound beam properties and the physiological properties of the scanned structures, tissues and fluids.

For the reason of improved lateral resolution you should choose the proper scan head for the depth range of the structure to be measured.

Table 2-11 Measurement accuracy

minisono C1-6

Mode	Measurement		Accuracy
2D	Depth		≥ 14 cm
	Distance	Axial	≤ 1 mm (Depth: 4 cm) ≤ 2 mm (Depth: 8 cm)
		Lateral	≤ 1 mm (Depth: 4 cm) ≤ 2 mm (Depth: 8 cm)
	Circumference	Ellipse	≤ 5 %
		Trace	≤ 5 %
	Area	2 Distance	≤ 5 %
		Ellipse	≤ 5 %
		Trace	≤ 5 %
M	Time		≤ 5 %
D	Velocity (30–70 cm/s)		≤ 15 %
	Doppler SV Depth		≤ 5 %
CF	Velocity		≤ 15 %

minisono L3-12

Mode	Measurement		Accuracy
2D	Depth		≥ 4 cm
	Distance	Axial	≤ 1 mm (Depth: 4 cm)
		Lateral	≤ 1 mm (Depth: 4 cm)
	Circumference	Ellipse	≤ 5 %
		Trace	≤ 5 %
	Area	2 Distance	≤ 5 %
		Ellipse	≤ 5 %
		Trace	≤ 5 %
M	Time		≤ 5 %
D	Velocity (30–70 cm/s)		≤ 15 %
	Doppler SV Depth		≤ 5 %
CF	Velocity		≤ 15 %

Calculation accuracy

Estimate the overall inaccuracy of a combined measurement and calculation by including the stated inaccuracy from the basic measurement accuracy statements.

Calculation formulas and databases are provided as a tool to assist the user, but should not be considered an undisputed database, in making a clinical diagnosis. The user is encouraged to research the literature and judge the equipment capabilities on an ongoing basis in order to assess its utility as a clinical tool.

3

After the Exam is Over

This chapter introduces the followings:

System Preset

In each preset menu, you can configure different default settings for its submenus.

System Preset Display

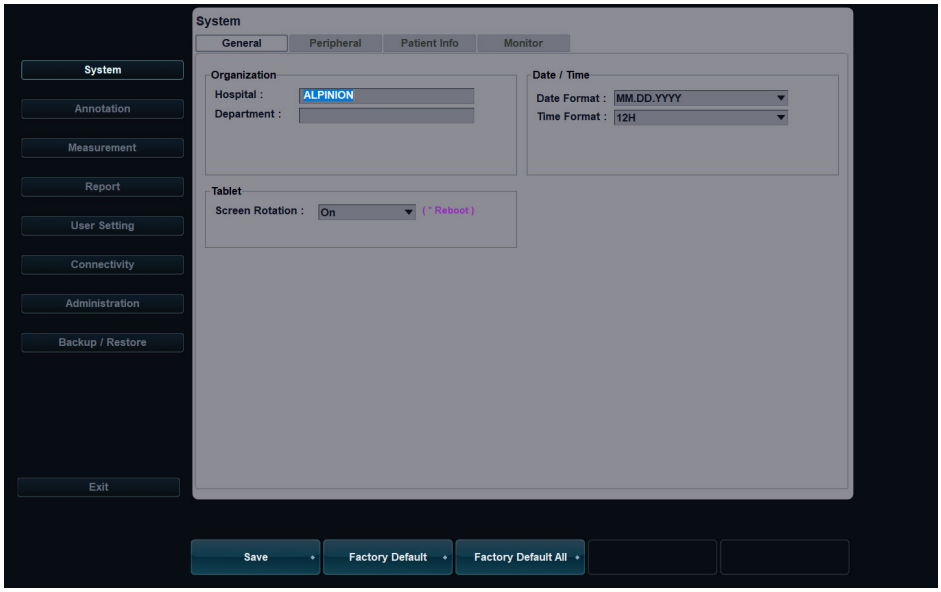


Figure 3-1 System preset display

General Workflow

To use the System Preset menu,

1. Tap the Quick menu icon (▽) on the display, and then tap **System Preset**.
2. To exit the menu, tap **Exit**.

To change the settings in System Preset,

1. Tap the Quick menu icon (▽) on the display, and then tap **System Preset**.
   The ***General*** screen appears.
2. Select the desired menu from the left side of the display.
3. Select the desired submenu tap from the top side of the display.
4. Change the settings for the selected menu.

5 When you have finished, tap **Exit** to save the changes.

NOTE

- To restore the settings on the current menu screen, tap **Factory Default**.
- To restore all settings of the system preset, tap **Factory Default All**.

System Preset Menus

To access preset menus, select the desired menu from the left side of the display.

NOTE

After changing some preset menus, you may need to reboot the system.

Table 3-1 System preset menu

Preset menu	Description
System	Customize the system configurations such as general settings, control panel, peripheral, patient info, and monitor calibration.
Annotation	Customize the comment and body pattern settings.
Measurement	Customize the labeled measurement for each study and create a new measurement and OB table.
Report	Customize the report and report print settings.
User Setting	Customize the user-defined settings.
Connectivity	Customize the DICOM device and service.
Administration	Create a user ID, activate the service browser, and view the option information.
Backup / Restore	Back up and restore data, and perform full backup for image data.

System

The **System** menu contains the following submenus:

- General
- Peripheral
- Patient Info
- Monitor

General

The **General** menu allows you to configure the general system settings such as hospital, time and date, and screen saver.

Organization

- **Hospital**: Enter a hospital name.
- **Department**: Enter a department name.

Date / Time

- **Date Format**: Select the desired date format.
- **Time Format**: Select the desired time format.

Tablet

- **Screen Rotation**: Set the tablet display to be rotated.

Peripheral

The **Peripheral** menu provides peripheral options for standard printer.

Printer Setting

- **Cleanup Printer Jobs in Queue When System Bootup**: Set to clear all printer jobs in queue when your system reboots.

Standard Printer(Report Only)

- **Default Printer**: Select a default standard printer that is used for printing reports and images.
- **Printer Paper**: Select a printing paper for the default printer.
- **Refresh**: Set the system to automatically refresh the printer list when you add a new printer. Select this option after installing a new printer is completed.

Patient Info

The **Patient Info** menu provides useful options related to patient management and E-View, and allows you to configure the patient banner display option.

Patient Information

- **Hide Patient Information**: Select to hide patient information on patient banner.
- **Patient Banner Line1**: Select the patient information to display patient banner line1 from the drop-down list.
- **Patient Banner Line2**: Select the patient information to display patient banner line2 from the drop-down list.

Patient Package Option

- **Auto ID Generation**: Set the system to automatically create a new patient ID when you select **New Patient**.
- **Auto Search for Patient**: Set the system to automatically search for the patient data when you enter the first letter of a patient ID in the ***Patient ID*** field.
- **Auto Logon**: Set the system to log on automatically.
- **Auto Archiving Patient Data**: Set the system to save the current patient data to archive automatically.
- **Use Birthdate**: Set the system automatically to enter an age when you enter a patient's birthdate.
- **Auto Exam Description change**: Set the system to automatically display the description as application/preset when you change the transducer, application, and preset on the ***Patient*** screen.
- **Quick Worklist**: Select to activate the worklist automatically when you activate the ***Patient*** screen.
- **Default Layout**: Select a default image layout.
- **Keep the last Column width of Patient List**: Select to save the last column width when you change the column width of the patient list.

Archive Option

Select an archive to be used for saving data when you select **End Study**.

NOTE

The default archive **"Local Archive"** cannot be deleted.

Monitor

The **Monitor** menu allows you to adjust the display pattern using gray bars and color bars. After the monitor adjustment, you need to check your peripherals.

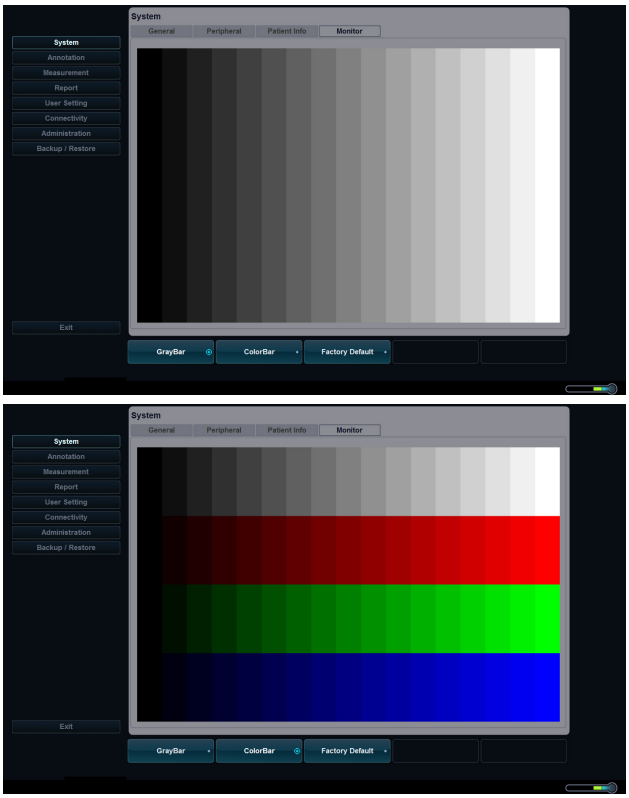


Figure 3-2 Gray & Color bars

NOTE

After adjusting the monitor settings, you may need to verify the peripheral functions, such as standard printer.

Annotation

The **Annotation** menu allows you to specify body pattern/text options and to define body pattern/text libraries on the context menu. The following menus are available: General, Body Pattern, and Text.

General

The **General** menu allows you to configure the text and body pattern options.

Text Preset

- **Font Color**: Select a font color for comment.
- **Font Size**: Select a font size (Small, Medium, or Large).
- **Arrow Size**: Select an arrow size (Small, Medium, Large, or X Large).

Body Pattern Preset

- **Pattern Size**: Select an arrow size (Small, Medium, or Large).

Body Pattern

The **Body Pattern** menu allows you to define and change body pattern libraries. The left side of the Body Pattern menu shows all available body pattern libraries, and the right side shows the specific body patterns for the selected library. Once you have defined body patterns for a library, they are shown on the context menu of the Body Pattern.

NOTE

To specify the default library per each preset, go to **User Setting** > **Annotation**.

To add a body pattern,

1. Select the library you want to add a body pattern from the library list.
2. Tap a body pattern you want and tap **Add**.
   The body pattern is shown on the bottom of the library.
3. To change the position of the body pattern, select the body pattern and tap **Up/Down/Left/Right**.
4. Tap **Save** to save the changes.

To delete a body pattern,

1. Select the library you want to delete a body pattern from the library list.
2. Tap a body pattern you want.
3. Tap **Delete** to delete the body pattern.
4. Tap **Save** to save the changes.

To change the location of a body pattern,

1. Select the library you want from the library list.
2. Tap a body pattern you want.
3. Tap **Up**, **Down**, **Left**, or **Right** to change the location of the body pattern.
4. Tap **Save** to save the changes.

Text

The **Text** menu allows you to change and define the text libraries. The left side of the Text menu shows all available text libraries, and the right side shows the specific text for the selected library. For each library, you can define up to one column with twenty three rows.

To add a text,

1. Select the library you want from the library list.
   The system shows all texts saved in the library.
2. Tap a text you want and tap **Add**.
   The text is shown on the bottom of the library.
3. To change the text position, select the text and tap **Up** or **Down**.
4. Tap **Save** to save the changes.

To create a new text,

1. Tap the ***New Text*** field.
2. Enter a new text and tap **Add**.
   The new text is shown on the bottom of the library.

To delete a text,

1. Select the library you want from the library list.
2. Tap a text you want.
3. Tap **Delete** to delete the text.
4. Tap **Save** to save the changes.

To change the text location,

1. Select the library you want from the library list.
2. Tap a text you want.
3. Tap **Up** or **Down** to change the text location.
4. Tap **Save** to save the changes.

Measurement

The **Measurement** menu allows you to specify measurement and calculation preset.

General

The **General** menu allows you to define the cursor and result window settings.

General

- **Repeat Measurement**: Set to repeat the measurement.
  - **Repeat**: The selected measurement on the context menu is repeated.
  - **None**: The measurement is not repeated.
  - **Default Measurement**: The basic measurement is repeated (e.g. Distance).
- **Tissue Depth display(2D,M)**: Set to show the tissue depth (depth from the transducer surface) when moving the measurement cursor in 2D or M mode.

Caliper

- **Caliper Type**: Select a caliper type (Number or Symbol).
- **Caliper Size**: Select a caliper size (Normal or Large).
- **Caliper Color**: Select a color for the fixed measurement cursor.
- **Caliper Line Width**: Select a line width of the caliper (Thin, Normal, or Thick).
- **Ellipse cross line display**: Set to show the cross line for ellipse.
- **Caliper line display**: Set to show the caliper line when measurement is completed.
- **D mode caliper cross line display**: Set to show the cross line of the caliper in D mode.
- **M mode caliper cross line display:** Set to show the cross line of the caliper in M mode.

Result Window

- **Direction**: Select a window direction (Top down or Bottom up).
- **Font Size**: Select a font size (Small, Medium, or Large).
- **Font Color**: Select a font color.
- **Position 2D**: Select a default position of the result window in 2D mode (Left Top, Left Bottom, Right Top, or Right Bottom).
- **Position TimeLine**: Select a default position of the result window in M and PW modes (Left Top, Left Bottom, Right Top, or Right Bottom).
- **Transparency**: Set to show the window background transparent or opaque.

Basic MEAS.

The **Basic MEAS.** menu shows all settings for the basic measurement in each application. Depending on the application, available settings may vary. You can define the basic measurement and default method for each basic measurement.

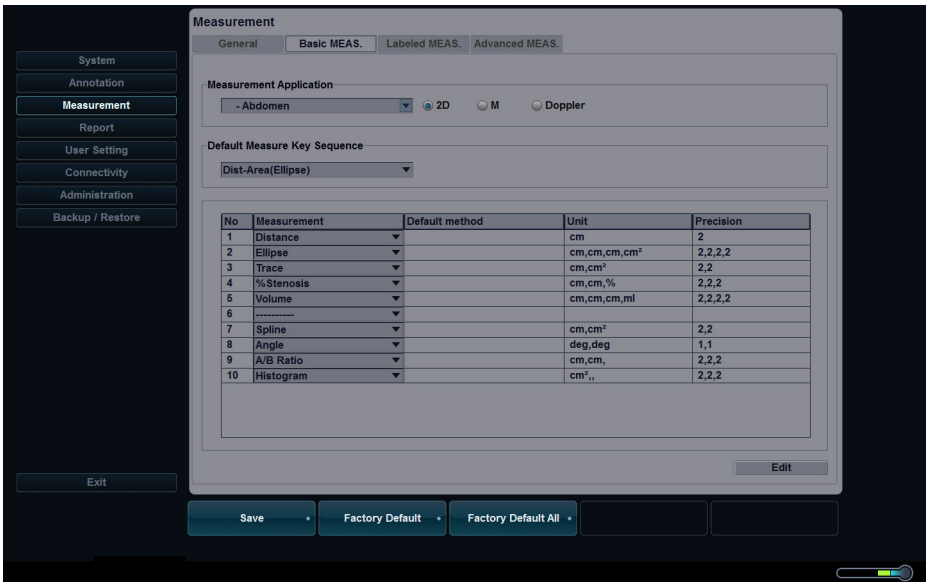


Figure 3-3 Basic measurement display

1. Select a measurement application.
2. Select a measurement mode (**2D**, **M**, or **Doppler**). The basic measurement entries of the selected measurement mode appear on the table.
3. Specify **General Measurement**.
   For example) OB1, M mode: Select 2 Sequences (Distance, Time) or 3 Sequences (Distance, Time, Slope).

Labeled MEAS.

The **Labeled MEAS.** menu shows all settings for the labeled measurement. You can control labeled measurement using the context menu in the measurement mode.

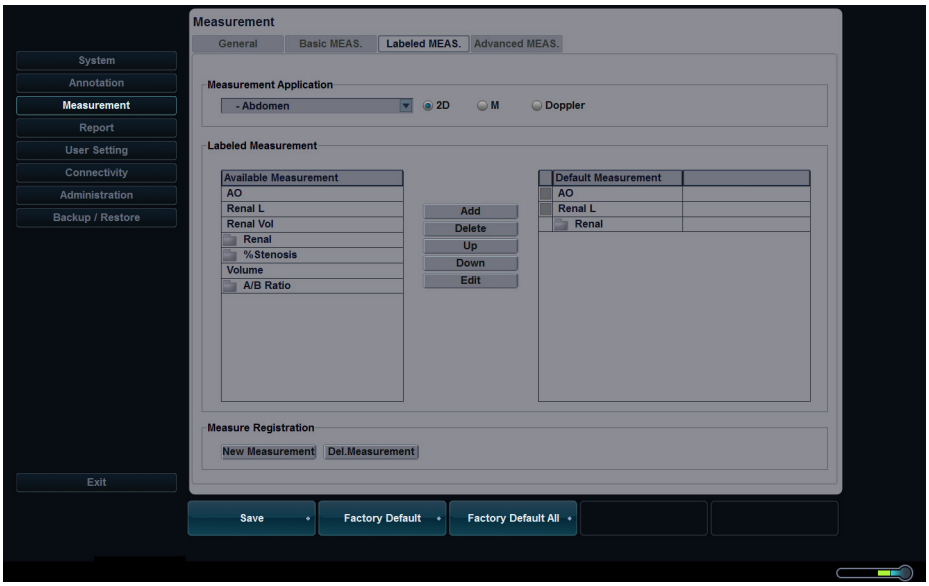


Figure 3-4 Labeled measurement display

1. Select a measurement application from the drop-down list.
2. Select a measurement mode (**2D**, **M**, or **Doppler**).
3. All of the available measurement lists appears on the left of the measurement window. The default measurements are shown on the context menu.
4. To add a measurement to the context menu, select a measurement from the ***Available Measurement*** list and tap **Add**.
5. To delete a measurement from the context menu, select a measurement from the ***Default Measurement*** list and tap **Delete**.
6. To change the order of a measurement from the context menu, select a measurement from the ***Default Measurement*** list and tap **Up** or **Down**.

Creating a new measurement

To create a new measurement entry,

1. Tap **New Measurement**.
2. Specify the following measurement information.
   - **Measurement Name**: Enter a measurement name. Make sure that the measurement name is unique.
   - **Measurement Type**: Select a measurement type among Distance, Area, Angle, Volume, and Disk volume from the drop-down list.
   - **Caliper Type**: Select a caliper type from the drop-down list.
   - **Parameter**: Set to show Parameter, Parameter Type, Unit, Precision and Method. You can modify Unit, Precision and Method by changing them from the drop-down list.

   NOTE

   Depending on the measurement mode, available measurement types and caliper types may differ.
3. To save the settings, tap **OK** and then **Yes**.
   You can see the new measurement in the ***Available Measurement*** list.

Editing a measurement

To edit a customized measurement,

1. Select a measurement from the list and tap **Edit** or double-tap the measurement.
   The ***Edit Measurement*** window appears on the screen.
2. Add or change the measurement by using **New Calculation** and **Edit Calculation**, and then change Unit, Precision and Method for report.
3. Tap **OK** and then **Yes** to save your changes.

   NOTE

   The default measurements cannot be edited.

Creating a new calculation

To create a new calculation,

1. Tap **New Calculation**.
2. Specify the following calculation information.
   - **Calculation Name**: Enter a calculation name. Make sure that the calculation name is unique.
   - **Formula**: Enter a calculation formula and tap **Check** to verify that the syntax is correct.
   - **Display Unit**: Select a display unit from the drop-down list.
   - **Display Group**: Select a display group from the drop-down list. The display group is shown on the ***Report*** page.
   - **Display Precision**: Select a display precision from the drop-down list.
   - **Measurement**: Select a measurement from the drop-down list.

   NOTE

   When you input parameters, suitable unit should be considered for calculation.
3. To save the settings, tap **OK** and then **Yes**.

Deleting a measurement

To delete a measurement entry,

1. Select a customized measurement from the ***Available Measurement*** list.
2. Tap **Del.Measurement**.

Advanced MEAS.

The **Advanced MEAS.** menu allows you to define application parameters, especially the Doppler measurement.

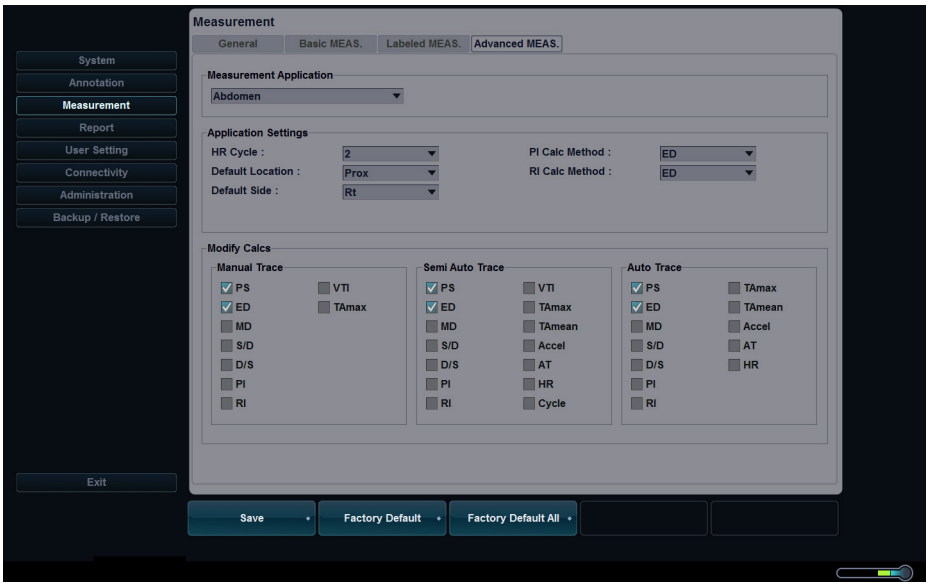


Figure 3-5 Advanced measurement display

Measurement Application

Select an application to be defined.

Application Settings

- **HR Cycle**: Select a heart rate cycle (1-10).
- **Default Location**: Select a default location for the selected application (Off, Prox, Mid, or Dist).
- **Default Side**: Select a default side (Left or Right).
- **PI Calc Method**: Select a parameter (ED or MD) to calculate PI (Pulsatility Index).
- **RI Calc Method**: Select a parameter (ED or MD) to calculate RI (Resistivity Index).

Modify Calcs

- **Manual Trace**: Select the measurements to perform the manual calculation for the selected application.
- **Semi Auto Trace**: Select the measurements to perform the semiautomatic calculation for the selected application.
- **Auto Trace:** Select the measurements to perform the automatic calculation for the selected application.

NOTE

To set up the Auto trace direction, Auto trace method, and Auto trace sensitivity, go to **Image Preset** > **General**.

Report

The **Report** menu allows you to specify report and report print preset.

Print

Print Logo

Change the logo image when you print the report.

Print Section

Set the print section for each application.

Print Header & Footer

Set the options for print header and footer.

– Select the **Different First Page** check box to set the header and footer for the first page differently.

User Setting

The **User Setting** menu allows you to configure application specific setting and to configure programmable keys such as user-defined keys.

Application

The **Application** menu allows you to specify the default application to be shown when the system starts up. You can also configure the default settings of transducer.

Annotation

The **Annotation** menu allows you to specify the default body pattern library to be shown in the **Body Pattern** menu. You can also specify the default text library to be shown when you use comments.

Measurement

The **Measurement** menu allows you to specify the default package measurement to be shown when you use the measurement.

Print

The **Print** menu allows you to define the Save key.

To assign the Save key,

1. Select the device you want to add under the device category.
2. Tap **>** on the middle of the display.

Save key functions

You can set the Save key to perform the following functions.

1. **Store Format**: Set the Save key to save an image to the clipboard. When you tap Save key, the current image is moved to the clipboard. The image format depends on the saving option and current status (live or frozen).

Table 3-2 Store format option

Option	Descriptions
Store Area	Select a saving area (Whole Screen, Diagnostic, or Full Diagnostic).

2 **Standard Printer**: Set the Save key to print the image via the standard printer. You can also print an image via other printers.

Table 3-3 Print option

Option	Descriptions
Printer Direction	Select a printing direction (Landscape or Portrait).
Printer Area	Select a printing area (Whole Screen, Diagnostic, or Full Diagnostic).
Printer Quality	Select a printing quality (Default, Low, Medium, or High).
Printer Paper	Select a printer paper.
Enable Video Invert	Set to print an image or the background in black.
Hide image parameter when image printed	Set to print an image with the image parameter hidden.

3 **DICOM Server**: Set the Save key to send an image to a DICOM device. To configure the DICOM settings, go to **System Preset** > **Connectivity** > **Storage** or **Print**.

4 **Network Storage & Media**: Set the Save key to send an image to network storage, USB flash drive, USB hard disk. To configure the network storage setting, go to **System Preset** > **Connectivity** > **General** > **Network Storage**.

Connectivity

The **Connectivity** menu allows you to configure the network connection and DICOM protocols. DICOM is an abbreviation of Digital Imaging and Communications in Medicine. This is a standard protocol for handling, storing, printing, and transmitting information in medical imaging. Using the DICOM option, you can send or print images after connecting the system and PACS.

NOTE

- DICOM is an optional service. To use this service, you need DICOM installation.
- To enter the connectivity screen, you must log in as an administrator.

General

The **General** menu allows you to configure the general network connection settings such as computer name, AE title, and port number.

NOTE

To set up Internet Protocol, contact your hospital's network administrator.

1. Enter a computer name in the ***Computer Name*** field.
2. Enter an Application Entity (AE) title in the ***AE Title*** field.
3. Enter a port number of your system in the ***Port No*** field.
   - **Cleanup DICOM Spooler jobs in Queue when System Bootup**: Set to delete all DICOM jobs in queue when system reboots.
4. Tap **Save**, and then tap **Yes** to save the changes.
5. Reboot your system.

Commonly used service parameters

There are certain parameters that may need to be set up for each service. The parameters are described on the following service.

- DICOM Storage
- DICOM Storage Commitment
- DICOM Print
- DICOM Worklist

Setting

- **Name**: Enter a description for each service.
- **AE Title**: Enter the Application Entity (AE) title of this service.
- **Port No**: Enter a port number of the service.
- **Retry**: Enter a maximum number of retry when the system fails to connect to a destination device.
- **Retry Interval(s)**: Set the time interval of retry.
- **Timeout(s)**: Set the period of timeout when the retry connection is over.

Verify

1. Select a destination.
2. Tap **Verify** to start verification. When the verification is completed, the one of the following icons is shown.

Table 3-4 DICOM verification

Icon	Description
	Successfully connected
	Failed in connection
	In progress

View

View allows you to view the connectivity architecture of your system such as configured DICOM service and network structured tree.

Net. Storage

The **Net. Storage** menu allows you to customize options for sending backup data to Shared directory. You can add and edit a network storage device.

To add a network storage device,

1. Tap **New**.
2. Enter a name of the network storage device in the ***Destination Name*** field.
3. Enter a shared directory path for the device in the ***Shared Dir*** field.
4. Enter an ID of the device in the ***ID*** field.
5. Enter a password of the device in the ***Password*** field.
6. Select a device that is connected to the intra network driver.
7. Tap **Verify** to verify the network connection.

To delete a network storage device,

1. Select the destination name that you want to delete.
2. Tap **Remove**.
3. Tap **Save**.

Properties

- **Type**: Select an image format to save images to network storage (JPEG, BMP).
- **2D Cine(*WMV)**: Save 2D CINE images as WMV format.

Storage

The **Storage** menu allows you to send images with DICOM standard format to view or interpret in PACS. In this menu, you can add, edit, and remove a DICOM storage service and configure the service properties.

To add a DICOM storage device,

1. Tap **New**.
2. Enter a name of the DICOM storage device in the ***Destination Name*** field.
3. Enter a device's IP address in the ***IP Address*** field.
4. Enter the Application Entity (AE) title for a device in the ***AE Title*** field.
5. Enter a port number in the ***Port No*** field.
6. Tap **Verify** to confirm the connection.
7. Tap **OK**.

To remove a DICOM storage device,

1. Select the destination name that you want to remove.
2. Tap **Remove**.
3. Tap **Yes** to confirm.

Properties

- **Compression**: Select a default compression type.
- **Quality**: Select a default image quality.
- **Monochrome**: Set to send images in monochrome. If you select **Monochrome** or **Color**, you will be asked every time to determine sending images in monochrome or color.
- **Commitment**: Set to receive notification from PACS when a study has been transferred successfully. When this option is enabled, you can specify the following information:
  - **Properties**: Select an associated storage.
  - **Accepter**: Specify the accepter's settings such as AE title, port number, and timeout.

Cleanup DICOM Spooler jobs in Queue when System Bootup

Set to delete all DICOM jobs in queue when system reboots.

Print

The **Print** menu provides an ability to send and receive ultrasound image data via DICOM printers.

Properties

- **Format**: Select a printing format that determines the number of images to be printed out in one page.
- **Priority**: Select the printing job priority.
- **Medium**: Select a printing medium.
- **Copies**: Select the number of copies.
- **Orientation**: Select a printing direction.
- **Film Size**: Select the dimensions of the film size.
- **Film Destination**: Select the film destination.
- **Magnification**: Select how the print magnifies the image to fit it onto the film.
  - **REPLICATE**: Interpolate pixels are copied of adjacent pixels.
  - **BILINEAR**: Interpolate pixels are created by bilinear interpolations between the adjacent pixels.
  - **CUBIC**: Interpolate pixels are created by cubic interpolations between the adjacent pixels.
  - **NONE**: No interpolation
- **Trim**: Set to show the trim box around images on the film.
- **Empty Image**: Set how to show empty images.
- **Color**: Select a color type.
- **Min Density**: Enter the minimum density level of the film.
- **Max Density**: Enter the maximum density level of the film.
- **Config. information**: Enter a name of the specified image quality setting.
- **Film Session Label**: Enter an organization name to be shown on the film label.
- **Smoothing Type**: Select the printer's magnification interpolation for the output.
- **Border**: Select a border area between the images of the film.

Worklist

The **Worklist** menu provides a list of patients sorted by query parameters. The **Search Criteria** menu allows you to define specific search parameters for the system to use when querying the patient archive.

To add a worklist,

1. Tap **New**.
2. Enter a name of the DICOM storage device in the ***Destination Name*** field.
3. Enter a device's IP address in the ***IP Address*** field.
4. Enter the Application Entity (AE) title for a device in the ***AE Title*** field.
5. Enter a port number in the ***Port No*** field.
6. Tap **Verify** to confirm the connection.
7. Tap **OK**.

To remove a worklist,

1. Select the destination name that you want to remove.
2. Tap **Remove**.
3. Tap **Yes** to confirm.

Search Criteria

- **DICOM Tag**: Select information type that you want to define for search parameters such as Modality and Referring Physician's name.
- **Value**: Enter the value of the selected tag item.
- **Add to list**: Add tag and value to the list of search criteria.
- **Remove**: Remove tag and value to the list of search criteria.
- **Clear**: Clear all tags from the list.

Administration

The **Administration** menu contains the following submenus:

- Service
- Users
- Options
- System Info

Service

To activate the service browser, tap **Service Station**. The Windows login screen appears. For more information, see the ***Service Manual***.

Users

The **Users** menu allows you to define the user settings.

To create a user ID,

1. Tap **New**.
2. Enter a user ID in the ***ID*** field. You can enter up to 16 characters.
3. Tap **OK** to save your settings.

NOTE

- Use alphanumeric keys only for the user ID. Do not enter symbols such as asterisk (*), question mark (?), and slash (/).
- After saving, you can edit all information except for the user ID.

To delete a user ID,

1. Select a user ID from the user list.
2. Tap **Delete**.
3. Tap **Yes** to save the changes.

To change the password,

1. Select a user ID from the user list.
2. Tap **Password**.
3. Enter the current password in the ***Old Password*** field.
4. Enter a new password in the ***New Password*** field.
5. Enter the new password again in the ***Confirm*** field.
6. Tap **OK** to save the changes.

Options

The **Options** menu allows you to view the status of optional functions that require license keys to be installed. The followings show the current status of the selected function.

- **Demo.**: The option is activated for a certain period that the manufacturer specified.
- **Activated**: The option is activated for 3 months after the activation.
- **Invalid**: The option is not installed.
- **Permanent**: The option is installed permanently.

To add or delete a license key, go to **Service** > **Service Station**.

System Info

The **System Info** menu allows you to view the current software and hardware versions of your system.

Backup / Restore

The **Backup / Restore** menu allows you to back up and restore the user data. You may lose user settings or patient information files such as patient's basic information and scanned images because of physical shocks to the product or internal errors. Therefore, you should back up user settings and patient information data on a regular basis.

The following submenus are available:

- User Backup
- Image Backup
- Full Backup

You can select a storage media (USB flash drive, USB hard disk, and network storage) to perform the backup.

NOTE

To save images permanently, avoid using the local hard disk. Regularly back up the image archive to a storage media.

CAUTION

Follow the suggested backup procedure in the manual. ALPINION MEDICAL SYSTEMS does not have the responsibility for data loss caused by the user's carelessness.

User Backup

You can use USB flash drive and USB hard disk for user preset backup.

The **User Backup** menu allows you to back up the each preset data. To select all user-defined presets, select the **User Defined Configuration** check box.

- **Image Preset**: Set to back up or restore the Image preset only.
- **Service**: Set to back up or restore the Service preset only.
- **Measurement**: Set to back up or restore the Measurement preset only.
- **Annotation**: Set to back up or restore the Text and Body Pattern preset only.
- **Connectivity**: Set to back up or restore the Connectivity preset only.
- **Others**: Set to back up or restore other presets such as System and User settings.

To back up the user preset data,

1. Insert a blank media properly on your system.
2. Select a media from the ***Media*** drop-down list.
3. Select the user preset you want to back up.
4. Tap **Backup** to start backup. The backup procedure begins.
5. After the backup is completed, the last backup time and date appear next to the preset category.

To restore the user preset data,

NOTE

Make sure that the software version of the data is the same as the system's software version. If NOT, you may not perform the restoration.

1. Insert a media on your system.
2. Select the user preset(s) you want to restore.
3. Tap **Restore** to start restoring. The restore procedure begins.

Image Backup

The **Image Backup** menu allows you to perform image backup using a storage media. Select your memory storage such as USB flash drive , USB hard disk, and network storage.

CAUTION

- While restoring Image Archive data, some existing database may be overwritten on the local hard disk and you may not be able to restore the old data. Make sure that you use the appropriate media before the restoration proceeds.
- Before restoring Image Archive, make sure that the software version is the same or compatible with the current system. The system may not proceed restoring if the version is different.
- Do NOT turn the system off while backup is in progress. You may lose your image data.

Media

- **Media**: Select your default storage media. Available media are USB flash drive, USB hard disk.

Image Archive Option

- **Backup period**: Specify the starting and ending date to back up patient data for a certain period.
- **Description**: Enter a description for the backup data.

To back up Image Archive,

1. Configure **Media**.
2. Configure **Image Archive Option**.
3. Prepare a storage media.
4. Tap **Backup** to start backup Image archive.
   The media formatting starts and the instructional message appears.

To restore and view backup data,

1. Enter the ***Patient Browser*** screen.
   - From the ***Patient*** screen, tab **Patient Browser**.
   - During an exam, tap the Quick menu icon (▽) on the display, and then tap **Browser**.
2. Insert your media that contains backup images.
3. Select a removable media from the ***Source*** drop-down list.
4. Tap **Import**. The progress bar appears while importing files.
5. View the backup images of the study you want.

Full Backup

NOTE

The USB hard disk drive is only available for the full preset backup.

This full preset backup is for service purpose only. You can back up the system data such as user preset, image archive, and service configuration.

Image Preset

To access the **Image Preset** menu, tap the Quick menu icon (▽) on the display, and then tap **Image Preset**.

To exit from the **Image Preset** menu, tap **Exit**.

Image Preset Display

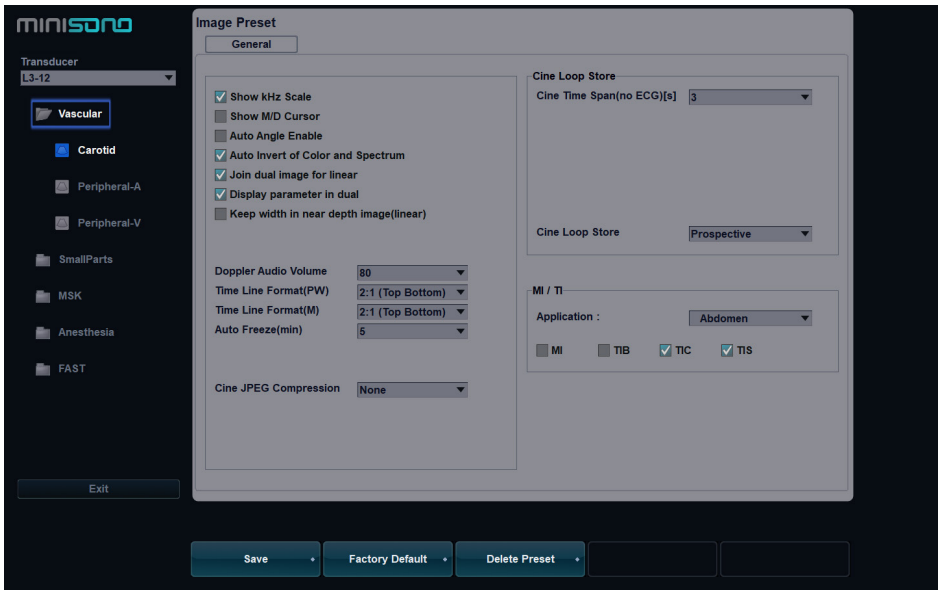


Figure 3-6 Image preset display

Changing image presets

To change imaging presets,

1. Tap the Quick menu icon (▽) on the display, and then tap **Image Preset**. The **General** menu appears.
2. Select the desired transducer from the transducer list.
3. Select the desired application from the application list.
4. To change a parameter, do one of the following:
   - Select the value from a list.
   - Select or clear a check box.
5. After changing the parameters, tap **Save** to save the changes.
6. Tap **Exit** to return to scanning.

New preset

You can create a new preset by tapping **New Preset**. Once you have added a new preset, it appears in the application list of the application selection, the ***Patient*** screen, and the ***Image Preset*** screen. This function is useful when you want to use user-defined presets easily.

To create a new preset,

1. Adjust the image parameter settings as you want.
2. Tap the Quick menu icon (▽) on the display, and then tap **New Preset**.
3. Select the application that you want to add from the ***Application*** list.
4. Enter a preset name in the ***Preset Name*** field.
5. To show the automatic preset selection when you change the transducer, select the **Automatic Preset selection when changes the transducer** check box.
6. When you have finished, tap **OK**.

To overwrite an existing preset,

1. Adjust the image parameter settings as you want.
2. Tap the Quick menu icon (▽) on the display, and then tap **New Preset**.
3. Select the application that you want from the ***Application*** list.
4. Select the preset that you want to overwrite from the ***Preset Name*** list.
5. To show the automatic preset selection when you change the transducer, select the **Automatic Preset selection when changes the transducer** check box.
6. When you have finished, tap **OK**.
7. Tap **Yes** to confirm.

To delete a preset,

1. Tap the Quick menu icon (▽) on the display, and then tap **Image Preset**.
2. Select the desired application from the application list, and then tap **Delete Preset**.
3. Tap **Yes** to confirm.

NOTE

The default presets cannot be deleted.

System Care and Maintenance

The user must ensure that system maintenance are performed regularly and as needed.

All exterior parts of the system and transducers must be cleaned and disinfected after each exam. It is important to follow the cleaning and disinfection process without shortening or skipping steps.

Device Maintenance

CAUTION

- Do not spray any liquid directly into the unit when cleaning the system.
- Do not immerse the system in any liquid when cleaning the system.

It is important to appropriately clean and maintain the ultrasound system and peripherals. If defects or malfunctions occur, you must immediately notify your local service representative.

Transducer Maintenance

WARNING

- To avoid electrical shock and damage to the system, disconnect the transducer before cleaning and disinfecting.
- Always use protective eyewear and gloves when cleaning and disinfecting transducers.
- Check the housing, strain relief, lens and seal for damage, and check for any functional problem after cleaning and disinfecting the transducer.

CAUTION

- When cleaning, do not spill or spray any liquid directly into the ventilation slots. It can damage the transducer and may void your warranty. Use cleaning wipes only in the vicinity of the ventilation slots.
- Do not use a surgical brush when cleaning the transducer.
- Do not use a cleaning brush when cleaning the transducer lens. Even the use of soft brushes can damage the transducer lens.
- Do not use paper products or products that are abrasive when cleaning the transducer. They damage the lens of the transducer.
- Be sure to use the proper concentration of enzymatic cleaner and rinse thoroughly.
- Before storing transducers, ensure that they are thoroughly dry.
- Do not wipe any other part of a transducer with isopropyl alcohol (including cables or strain reliefs), as it can damage those parts of the transducer. This damage is not covered by the transducer warranty.

It is important to appropriately clean and disinfect the transducer. Using an inappropriate cleaning or disinfecting agent may damage the product. If defects or malfunctions occur, you must immediately notify your local service representative.

Cleaning the transducer

1. Disconnect the transducer from the system.
2. Moisten a clean gauze pad with purified water and wipe the transducer to remove any gel or particles remaining on the transducer. If purified water is not effective, then you can use an approved pre-cleaner or low-level disinfectant.
3. Carefully wipe the entire transducer, including the cable and connector.
   When cleaning the connector, do not allow any type of fluid to enter through the connector strain relief and electrical contacts.
4. To remove remaining particulate and cleaning residue, use cleaning wipes according to the manufacturers' instructions, or rinse thoroughly with water up to the immersion point.
   Do not immerse the connector, connector strain relief, or cable that is within 5 cm of the connector strain relief.

   NOTE

   If you place the transducer into the water or cleaning solution, make sure not to immerse the transducer into the liquid beyond the immersion level. See "Transducer Immersion Level" on page 3-35 for more information.
5. If remaining particulate and cleaning residue have dried onto the transducer surface, scrubbing with a soft bristle brush may be necessary.

   NOTE

   Do not use a cleaning brush when cleaning the transducer lens. Even the use of soft brushes can damage the transducer lens.
6. After cleaning the transducer, use a clean cloth to dry the transducer.
   To dry the lens, use a soft cloth and a blotting motion instead of a wiping motion.
7. Examine the housing, strain relief, lens and seal for damage, and check for any functional problem. If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

Disinfecting the transducer

CAUTION

- Do not wipe the cable, strain relief, and connector of the transducer with the disinfectant, as it can damage and/or discolor those parts of the transducer.
- Do not immerse transducers for longer than one hour, unless they are sterilizable.
- Using a non-recommended disinfectant or not following the recommended disinfection method can damage and/or discolor the transducer and will void the transducer warranty.

To low-level disinfect a transducer,

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. After cleaning, choose a low-level disinfection solution compatible with your transducer.
4. Low-level disinfect the transducer by following the disinfection method recommended by the disinfection solution manufacturer.
5. After disinfecting, examine the housing, strain relief, lens and seal for damage, and check for any functional problem.
   If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

To high-level disinfect a transducer,

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. After cleaning, choose a high-level disinfection solution compatible with your transducer. If a pre-mixed solution is used, be sure to observe the solution expiration date.
4. Disinfect or high-level disinfect the transducer by following the disinfection method recommended by the disinfection solution manufacturer.

   NOTE

   If you place the transducer into the water or disinfection solution, make sure not to immerse the transducer into the liquid beyond the immersion level. See "Transducer Immersion Level" on page 3-35 for more information.
5. Rinse the transducer with plenty of sterile water to remove all chemical residues on it. Or follow the rinsing method recommended by the disinfectant manufacturer to rinse the transducer.
6. Wipe off the water on the transducer with sterile cloth or gauze after rinsing it. Do not dry the transducer by heating.
7. Examine the housing, strain relief, lens and seal for damage, and check for any functional problem.
   If any damage is found, do not use a transducer and contact your ALPINION MEDICAL service engineer or an authorized agent.

Transducer Immersion Level

CAUTION

- Make sure not to immerse the transducer into any liquid beyond the immersion level specified for that transducer.
- Do not allow any liquid to enter through the ventilation slots of the transducer.
- Do not immerse the transducer connector and cable in liquid.

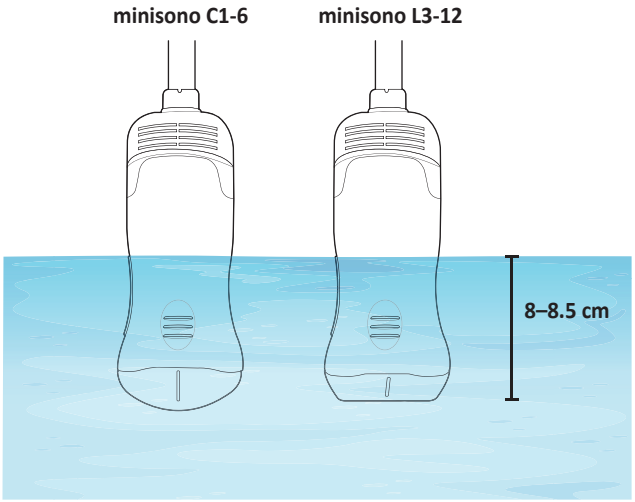


Figure 3-7 Transducer Immersion Level

List of Compatible Disinfectants and Cleaning Solutions

ALPINION MEDICAL SYSTEMS routinely reviews new cleaning and disinfection solutions for compatibility with the materials used in the transducer housing, cable and lens in order to provide users with options in choosing a cleaning or disinfection solution. Refer to Download Center on website (http://www.alpinion.com/web/support/download.asp) for the latest list of compatible cleaning solutions and disinfectants.

- HLD=High level disinfectant, ILD=Intermediate level disinfectant, LLD=Low level disinfectant
- Y=Yes, N=No
- S=Spray, W=Wipes, L=Liquid, P=Powder, G=Gel, D=Device
- O=Approved, X=Not approved (DO NOT USE), Δ=Untested (DO NOT USE)

Table 3-5 List of Compatible Disinfectants and Cleaning Solutions

	Disinfectant (1)											
	Cidex	Cidex OPA	Gigasept AF	Gigasept FF	Virkon	Cidex Plus	Wavicide-01	AIDAL PLUS	Cetylcide-G	Hibitane	Metricide 14	Sporicidin
Level	HLD	HLD	-	HLD	HLD	HLD	HLD	HLD		-	HLD	HLD
FDA Approval	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
TYPE	L	L	L	L	P	L	L	L	L	L	L	L
C1-6	Δ	O	Δ	X	O	O	O	O	Δ	Δ	Δ	X
L3-12	Δ	O	Δ	X	O	O	O	O	Δ	Δ	Δ	X

	Disinfectant (2)											
	Omnicide -FG2	Nuclean	Ster-Bac Blu	Sani-Cloth HB	PeraSafe	Super Sani-Cloth	Cleanisept wipes	CLEANISEPT ® WIPES forte	Protex	Tristel Duo	SteriMax® Sporicide Wipes	SteriMax® Wipes
Level	-	-	-	LLD	HLD	-	LLD	LLD	LLD	HLD	-	-
FDA Approval	Y	N	N	N	N	N	N	N	Y	Y	N	N
TYPE	L	L	L	W	L	W	W	W	S	S	W	W
C1-6	Δ	Δ	Δ	Δ	Δ	O	O	O	O	O	O	X
L3-12	Δ	Δ	Δ	Δ	Δ	O	O	O	O	O	O	X

	Disinfectant (3)											
	SteriMax Sporicide	UltraSan Broad Spectrum	CaviCide	CaviWipes	Metricide OPA Plus	Metricide	Meliseptol Wipes sensitive	Meliseptol Wipes ultra	Revital-OX Resert	Meliseptol Foam pure	Sporox II	Protex wipes
Level	-	-	-	L/ILD	HLD	HLD	-	-	HLD	-	HLD	-
FDA Approval	N	N	Y	Y	Y	Y	N	N	Y	N	Y	Y
TYPE	S	S	S	W	L	L	W	W	L	L	L	W
C1-6	X	X	X	O	O	O	X	O	O	O	O	O
L3-12	X	X	X	O	O	O	X	O	O	O	O	O

	Disinfectant (4)						Pre-Cleaner (1)					
	Sani-cloth AF3	Acrylan	Descogen Liquid	Cutasept F	Cutasept G	Mikrobac Virucidal Tissues	T-spray	T-spray II	Enzol	Theracide Plus(S5N)	Transeptic	Metrizyme
Level	L/ILD	-	-	-	-	-	-	-	-	-	-	-
FDA Approval	Y	N	N	N	N	N	Y	Y	Y	N	Y	Y
TYPE	W	L	L	L	L	W	S	S	L	L	L	L
C1-6	O	X	O	X	X	O	Δ	Δ	O	Δ	Δ	O
L3-12	O	X	O	X	X	O	Δ	Δ	O	Δ	Δ	O

	Pre-Cleaner (2)					
	Klenzyme	McKesson	Cidezyme	Endozyme	EmPower	Ultrasound probe cleaning wipes
Level	-	-	-	-	-	-
FDA Approval	Y	Y	Y	Y	Y	N
TYPE	L	L	L	L	L	W
C1-6	Δ	Δ	Δ	Δ	O	O
L3-12	Δ	Δ	Δ	Δ	O	O

	Solution		
	Trophon® EPR	Antigermix	V-PRO
Level	-	-	-
FDA Approval	-	-	-
TYPE	**D**	**D**	**D**
C1-6	O	O	O
L3-12	O	O	O

NOTE

Slight discoloration of parts of the transducer such as housing and cable can occur when disinfecting the transducer with Antigermix or V-PRO. This has no influence on the performance of the transducer.

4

Safety

This chapter introduces the followings:

Safety Summary

You should make sure the following safety precautions during all phases of operation, service, and repair of the minisono ultrasound system. If you fail to comply with these safety precautions or specific warnings in this manual, you violate safety standards in terms of design, manufacture, and intended use of this system. ALPINION MEDICAL SYSTEMS Co., LTD. does not have liability for your failure to comply with these requirements.

Safety Notice

WARNING

A WARNING notice indicates a hazard. You need to observe an operating procedure, practice, or conducts like that. If you do not correctly perform this notice, it could result in personal injury or death.

CAUTION

A CAUTION notice indicates a hazard. You need to observe an operating procedure, practice, or conducts like that. If you do not correctly perform this notice, it could result in damage to the system or loss of important data.

Equipment Safety Information

WARNING

- Do not remove the covers of a system yourself to avoid damage to the system and unexpected electrical shock. Only qualified ALPINION service engineer must repair or replace components.
- Do not modify this system such as system components, or software. When you modify the system, it may cause safety hazards. Only qualified ALPINION service engineer must modify the system.
- When you observe that the system causes any malfunction, you must stop operating the system and take proper action for patients. After that, contact ALPINION service engineer.
- The system voltage may cause serious injury or damage to the system.
- For patient safety, you must locate the system to easily unplug the power cord from the power outlet when a malfunction or an error occurs.
- Always make sure that you do not use the system in an explosive atmosphere.
- Before cleaning up and disinfecting the system, always make sure you turn off the system power and unplug the power cord from the power outlet.
- Do not allow water or liquids on or above the system. Dripping water or liquids into the system may cause electrical shock and damage to the system.
- You must follow safety precautions and avoid any situation that causes injury or damage.
- Always use the system properly to avoid serious injury. Before using the system, you must make sure the instructions and hazards involving ultrasound system. ALPINION provides training assistance, if needed.
- The use of the equipment outside the described conditions or intended use, and disregarding safety related information is considered abnormal use. The manufacturer is not liable for injury or damage caused by abnormal use. Any abnormal use will void the warranty of the equipment.
- Always use peripherals and accessories approved by ALPINION. You must securely connect peripherals and accessories to the system.
- Always use transducers approved or recommended by ALPINION.
- You must use the monitoring devices and AC/DC adapter outside of the patient environment.

Patient Safety Information

WARNING

- When you enter patient data, always make sure that you enter correct identification with the patient data.
- Do not use the system until you become familiar with the system operation.
- To avoid the transducer from overheating, you must freeze the system when imaging is not performed.

CAUTION

- Do not allow the system to transmit acoustic output when the transducer is not in use. Otherwise, it could result in overheating of the transducer.
- When not using the system, you should freeze the image or turn off the acoustic output.
- Do not allow the germicide to contact your patient. Contact to the patient's skin or mucous membrane may cause an inflammation.

Electrical Safety Information

WARNING

- Do not clean or disinfect a system before turning off and unplug the system from the power outlet. Otherwise, it could result in electrical shock and damage to the system.
- Do not place water or liquids on the system. Dripping water or liquids into the system may cause electrical shock and damage to the system.
- Do not remove the panels or covers of a system to prevent system damage and electrical shock.
- Do not use extension cords, adaptors or converters, which are a three-prong to two-prong type, to connect with a power plug.
- The system voltage may cause serious injury or damage to the system. When you observe that the system causes any malfunction, you must stop operating the system and take proper action for patients. After that, contact ALPINION service engineer.
- Do not modify the AC power connector plug of the system to prevent electrical shock.
- You should use the ultrasound system after few hours when the system is in a humidity place.
- Do not connect, disconnect, or replace any part of the system during the scanning of a patient at the same time.
- Do not replace the fuse or power cord by yourself. An ALPINION MEDICAL service engineer or an authorized agent must perform the replacement. Replacing the fuse or power cord by yourself will avoid your warranty.
- Using spray cleaners on the system drips cleaning fluid into the system. It damages components in the system.
- Do not use aerosol spray cleaners on the monitor to prevent electrical shock and damage to the system.

Transducer Safety Information

WARNING

- Do not use damaged or defective transducer to prevent system damage and serious patient injury.
- Make sure you do not bend or pull the transducer cable to prevent the damage to the transducer.
- Use only approved disinfectants and cleaning solutions. Using unapproved disinfectants and cleaning solutions may damage the transducer and void the warranty.
- Use only approved coupling gels. Using unapproved gels may damage the transducer and void the warranty.

CAUTION

- Do not drop the transducer. Always keep the transducer secure when you do not use it.
- Using damaged or defective transducer causes unexpected electric shock. Make sure to use and take care of the transducer accordingly.
- Do not allow the system to transmit acoustic output when the transducer is not in use. Otherwise, it could result in overheating of the transducer.
- When not using the system, you should freeze the image or turn off acoustic output.
- To avoid serious patient injury, always inspect the transducer that you use has sharp edges and rough surfaces.
- Proper cleaning and disinfecting the transducer prevent disease transmission. You must follow infection control procedures.
- Make sure that you do not use an expired transducer sheath.
- Using pre-lubricated condoms as a sheath might damage the transducer.
- Do not allow your eyes (or patient's eyes) to contact the coupling gel. If there is gel contact to the eyes, flush thoroughly with clean water.

Regulatory Information

The minisono ultrasound system conforms to the following classifications, in accordance with the IEC/EN 60601-1.

Classifications:

- Type of protection against electrical shock: Internally powered or Class II
- Degree of protection against electrical shock (Patient connection): Type BF equipment
- Degree of protection against harmful ingress of water: Ordinary equipment and all of applied parts (IPX7) meet ingress protection level according to IEC 60529.
- Degree of safety of application in the presence of a flammable anesthetic material with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation: Continuous operation

The minisono ultrasound system conforms to the following standards:

- MDR 2017/745
- EN ISO 10993-1:2009 (ISO 10993-1:2009)
- EN ISO 10993-10:2013 (ISO 10993-10:2010)
- EN ISO 10993-5:2009 (ISO 10993-5:2009)
- EN ISO 13485:2016 (ISO 13485:2016)
- EN ISO 14971:2019 (ISO 14971:2019)
- EN ISO 15223-1:2021 (ISO 15223-1:2021)
- EN 1041:2008+A1:2013
- EN 55011:2016+A1:2017 (CISPR 11:2015/AMD1:2016)
- EN 55032:2015 (CISPR 32:2015)
- EN 60601-1:2006+A2:2014 (IEC 60601-1:2005/AMD1:2012/COR1:2014)
- EN 60601-1-2:2015 (IEC 60601-1-2:2014)
- EN 60601-1-6:2010+A1:2015 (IEC 60601-1-6:2010/AMD1:2013)
- EN 60601-2-37:2008+A11:2011+A1:2015 (IEC 60601-2-37:2007/AMD1:2015)
- EN 61000-3-2:2014 (IEC 61000-3-2:2018)
- EN 61000-3-3:2013 (IEC 61000-3-3:2013)
- EN 61000-4-11:2004 (IEC 61000-4-11:2004)
- EN 61000-4-2:2009 (IEC 61000-4-2:2008)
- EN 61000-4-3:2006+A1:2008+A2:2010 (IEC 61000-4-3:2006/AMD2:2010)
- EN 61000-4-4:2012 (IEC 61000-4-4:2012)
- EN 61000-4-5:2014 (IEC 61000-4-5:2014)

- EN 61000-4-6:2014 (IEC 61000-4-6:2013)
- EN 61000-4-8:2010 (IEC 61000-4-8:2009)
- EN 62304:2006+A1:2015 (IEC 62304:2006/AMD1:2015)
- EN 62366-1:2015 (IEC 62366-1:2015)
- MEDDEV 2.12/2 Rev.2
- MEDDEV 2.7.1 Rev.4
- NEMA UD2:2004 (R2009)
- Medical Devices Regulations (SOR/98-282)
- 의료기기법, 의료기기법 시행령, 의료기기법 시행규칙

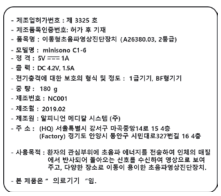
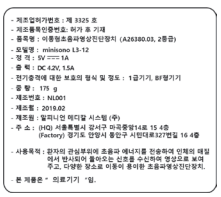
Manufacturer:

Name: Alpinion Medical Systems Co., LTD.
Address: 4F, 15, Magokjungang 14-ro,
Gangseo-gu, Seoul, 07789, Republic of Korea
Phone: +82 (2) 3777 8500

System Symbols and Labels

The following is a list of system symbols and labels for safety. They indicate that you must refer to the manual for specific information to avoid personal injury or damage to the product.

Safety symbols/ Labels	Location	Explanation
	On the transducer label	Patient applied part meets the isolation requirements for type BF equipment
	On the transducer label	This symbol indicates that the transducer meets immersion requirements. Depending on the transducer model, the immersion label may differ.
	On the transducer label	This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling. By separating this product from other household-type waste, the volume of waste sent to incinerators or land-fills will be reduced and natural resources will thus be conserved. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.
	On the transducer label	Consult instructions for use (or consult operating instructions)
	On the transducer label	Warning – the accompanying information must be followed to prevent serious accidents or damage to property.
	On the transducer label	IEC 60878-5031
	On the transducer label	Class II
	On the transducer label	This symbol indicates that the transducer should not be used in the MRI scanner room.
	On the transducer label	Date of manufacture See ISO 8601 for date format

Safety symbols/ Labels	Location	Explanation
	On the transducer label	Symbol for manufacturer This symbol shall be accompanied by the name and the address of the manufacturer.
SN	On the transducer label	Serial Number
	Transducer	Caution label
	Transducer	Transducer name, Serial, Manufacturing date
	Transducer	Transducer name, Serial, Manufacturing date
	Package box	System rating label for overseas
	Package box	System rating label for overseas
	Package box	System rating label for domestics
	Package box	System rating label for domestics

Electromagnetic Compatibility (EMC)

This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with emissions limits for a Group 1, Class Medical Devices Regulation as stated in EN 60601-1-2.

Electrical medical equipment requires special precautions regarding EMC and must be installed and implemented according to the EMC information provided in the user manual.

AII types of electronic equipment may characteristically cause electromagnetic interference with other equipment, transmitted either through air or connecting cables. The term Electromagnetic Compatibility (EMC) indicates the capability of the equipment to curb electromagnetic influence from other equipment, while at the same time not affecting other equipment with similar electromagnetic radiation.

Radiated or conducted electromagnetic signals can cause distortion, degradation, or artifacts in the ultrasound image which may impair the ultrasound unit's essential performance.

There is no guarantee that interference will not occur in a particular installation. If this equipment is found to cause interference (which may be determined by turning the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem by one or more of the following measure(s):

- Reorient or relocate the affected device(s).
- Increase the separation between the equipment and the affected device.
- Power the equipment from a source different from that of the affected device.
- Consult the point of purchase or service representative for further suggestions.

Use of accessories, transducers and cables other than those specified may result in increased emission or decreased immunity of the equipment.

The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.

Devices which intrinsically transmit radio waves, such as cellular phones, radio transceivers, mobile radio transmitters, radio-controlled toys, etc., should preferably not be operated near the equipment. Keep the power to these type devices turned off when near the equipment.

NOTE

Use of devices that transmit radio waves near the equipment could cause it to malfunction. See "Minimum distances" on page 4-17 for information about the recommended minimum separation distances between portable and mobile RF communications equipment and the ultrasound unit.

The system or its components should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the system or its components should be observed to verify normal operation in the configuration in which it will be used.

The medical staff in charge of this equipment is required to instruct technicians, patients, and other people who maybe around this equipment to fully comply with the above requirement.

Electromagnetic emissions

This system is suitable for use in the following environment. The user must assure that it is used only in the electromagnetic environment as specified.

Guidance and manufacturer's declaration–electromagnetic emissions

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The minisono uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The minisono is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes. WARNING: This system is intended for use by healthcare professionals only. This system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the system or shielding the location.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

Electromagnetic immunity

This system is suitable for use in the following environment. The user must assure that the system is used according to the specified guidance and only in the electromagnetic environment listed.

Guidance and manufacturer's declaration-electromagnetic immunity

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±8 kV Contact ±2,4,8,15 kV air	±8 kV Contact ±2,4,8,15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/ output lines	±2 kV for power supply lines ±1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±0.5,1 kV line(s) to line(s) ±0.5,1,2 kV line(s) to earth	±0.5,1 kV line(s) to line(s) ±0.5,1,2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 0 % U_T (> 95 % dip in U_T) for 0.5 cycle 0 % U_T (60 % dip in U_T) for 1 cycle 70 % U_T (30 % dip in U_T) for 25 cycle, 30 cycle <0 % U_T (> 95 % dip in U_T) for 250 cycle, 300 cycle	< 0 % U_T (> 95 % dip in U_T) for 0.5 cycle 0 % U_T (60 % dip in U_T) for 1 cycle 70 % U_T (30 % dip in U_T) for 25 cycle, 30 cycle <0 % U_T (> 95 % dip in U_T) for 250 cycle, 300 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the minisono image intensifier requires continued operation during power mains interruptions, it is recommended that the minisono image intensifier be powered from an uninterruptible power supply.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration-electromagnetic immunity

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment -guidance [c]
level	Electromagnetic environment - guidance	3 Vrms 3 V/m	Portable mobile RF communications equipment should be used no closer to any part of the minisono, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1{,}2\sqrt{P}$ $d = 1{,}2\sqrt{P}$ 80 MHz to 800 MHz $d = 2{,}3\sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as deter-mined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol : 

NOTE 1) At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the EUT is used exceeds the applicable RF compliance level above, the EUT should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the minisono.

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

[c] See examples of calculated separation distances in next table.

Minimum distances

The minisono is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the minisono can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the minisono as recommended below, according to the maximum output power of the communications equipment.

CAUTION

Portable and mobile RF communications equipment (e.g. peripherals such as antenna cables and external antennas, two-way radio, cellular phones, wireless computer networks) should be used no closer than 30 cm (12 inches) to any part of this system including cables provided by or designated by ALPINION MEDICAL SYSTEMS.

Recommended separation distances between portable and mobile RF communications equipment and the ultrasound unit

Rated maximum output power of transmitter [W]	Separation distance according to frequency of transmitter [m]		
	150 kHz to 80 MHz $d = 1{,}2\sqrt{P}$	80 MHz to 800 MHz $d = 1{,}2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2{,}3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (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.

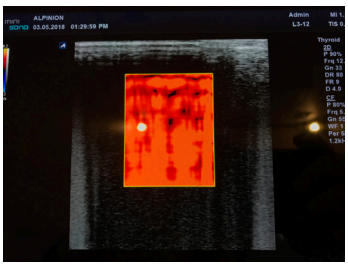
Immunity and compliance level for system

Immunity test	Frequency of Interest [MHz]	Actual Immunity Level	Compliance Level
Conducted RF IEC 61000-4-6	0.15 MHz to 80 MHz	3 Vrms	0.3 Vrms
Radiated RF IEC 61000-4-3	80 MHz to 800 MHz	3 V/m	1 V/m
	800 MHz to 2.5 GHz	3 V/m	3 V/m

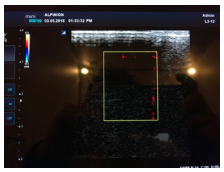
Immunity and compliance level for transducer

Conducted RF IEC 61000-4-6

Transducer: minisono L3-12 (2 Hz, C mode)

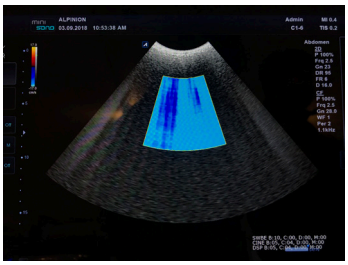
Image at Frequency of Interest	Frequency of Interest** [MHz]	Actual Immunity Level
 Conducted RF IEC 61000-4-6	4.83 MHz to 7.49 MHz	3 Vrms
	5.18 MHz to 6.26 MHz	1 Vrms*

* Voltage Level at which the RF Induced Noise is No Longer Discernable from the system ambient background noise.
** With the exception of indicated frequencies, it is 3 Vrms from 0.15 MHz to 80 MHz.

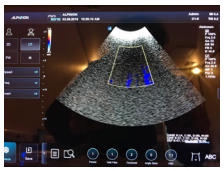
Frequency of Interest [MHz]	F_1=5.84
Image at Frequency of Interest	
Voltage Level at which the RF Induced Noise is No Longer Discernable from the System Ambient Background Noise	0.32 Vrms

Conducted RF IEC 61000-4-6

Transducer: minisono C1-6 (2 Hz, C mode)

Image at Frequency of Interest	Frequency of Interest** [MHz]	Actual Immunity Level
 Conducted RF IEC 61000-4-6	1.99 MHz to 3.41 MHz	3 Vrms
	2.31 MHz to 3.38 MHz	1 Vrms
	2.36 MHz to 3.25 MHz	0.3 Vrms*

* Voltage Level at which the RF Induced Noise is No Longer Discernable from the system ambient background noise.
** With the exception of indicated frequencies, it is 3 Vrms from 0.15 MHz to 80 MHz.

Frequency of Interest [MHz]	F_1=2.85
Image at Frequency of Interest	
Voltage Level at which the RF Induced Noise is No Longer Discernable from the System Ambient Background Noise	0.25 Vrms

Diagnostic Ultrasound Indications for Use

minisono L3-12 Ultrasound Imaging System

Indications for Use (Describe)

The device is intended for use by a qualified physician for the evaluation of soft tissue and blood flow in the clinical applications; Small Organ (breast, testes, thyroid), Musculo-skeletal (Conventional), Musculo-skeletal (Superficial), Peripheral Vascular (PV).

Clinical Application	Mode of Operation								
	B	M	PWD	CWD	Color Doppler	Power Doppler	Tissue Harmonic Imaging	Combined* (Specify)	Other** (Specify)
Ophthalmic									
Fetal									
Abdominal									
Intra-operative (Specify)									
Intra-operative (Neuro)									
Laparoscopic									
Pediatric									
Small Organ (breast, testes, thyroid)	N	N	N		N	N	N	N	
Neonatal Cephalic									
Adult Cephalic									
Trans-rectal									
Trans-vaginal									
Trans-urethral									
Trans-esoph. (non-Card.)									
Musculo-skeletal (Conventional)	N	N	N		N	N	N	N	
Musculo-skeletal (Superficial)	N	N	N		N	N	N	N	
Intravascular									
Cardiac Adult									
Cardiac Pediatric									
Intravascular (Cardiac)									
Trans-esoph. (Cardiac)									
Intra-cardiac									
Peripheral vessel	N	N	N		N	N	N	N	
Urology (including prostate)									

N = new indication; P = previously cleared; E = added under appendix

* Combined: B/Color Doppler, B/PWD, B/Color Doppler/PWD; **Other: 3D, 4D

Indications for Use (Describe)

The device is intended for use by a qualified physician for the evaluation of soft tissue and blood flow in the clinical applications; Abdominal (renal & GYN/pelvic), Musculo-skeletal (Conventional), Musculo-skeletal (Superficial), Peripheral Vascular (PV).

Clinical Application	Mode of Operation								
	B	M	PWD	CWD	Color Doppler	Power Doppler	Tissue Harmonic Imaging	Combined* (Specify)	Other** (Specify)
Ophthalmic									
Fetal									
Abdominal	N	N	N		N	N	N	N	
Intra-operative (Specify)									
Intra-operative (Neuro)									
Laparoscopic									
Pediatric									
Small Organ (breast, testes, thyroid)									
Neonatal Cephalic									
Adult Cephalic									
Trans-rectal									
Trans-vaginal									
Trans-urethral									
Trans-esoph. (non-Card.)									
Musculo-skeletal (Conventional)	N	N	N		N	N	N	N	
Musculo-skeletal (Superficial)	N	N	N		N	N	N	N	
Intravascular									
Cardiac Adult									
Cardiac Pediatric									
Intravascular (Cardiac)									
Trans-esoph. (Cardiac)									
Intra-cardiac									
Peripheral vessel	N	N	N		N	N	N	N	
Urology (including prostate)									

N = new indication; P = previously cleared; E = added under appendix

* Combined: B/Color Doppler, B/PWD, B/Color Doppler/PWD; **Other: 3D, 4D

Acoustic Output

The minisono ultrasound system shows the acoustic output display (e.g. Mechanical Index (MI), Thermal Index (TI)) on the upper right side of the screen. This acoustic output display allows you to monitor the acoustic levels generated by the system.

Two standards for the acoustic output display are as follows:

AIUM/NEMA UD3 Standards for Real-time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound equipment.

IEC 60601-2-37, Mechanical Electrical Equipment – Part2-37: Particular Requirements for the Safety of Ultrasound Medical Diagnostic and Monitoring Equipment.

WARNING

You should use the minisono ultrasound system at the lowest mechanical/thermal index setting necessary to generate clinically acceptable images.

Acoustic output display (Mechanical/Thermal indices)

The minisono ultrasound system displays Mechanical index (MI) and Thermal index (TI) on the upper right side of the screen.

The acoustic output display has three values as follows:

- Mechanical Index (MI)
- Thermal Index (TI)
- Power value

MI is used as an indicator of the mechanical bio-effect such as cavitation in the tissue. TI represents the ratio of total power to the power required to raise tissue by 1°C. The power value informs you of where the system is operating within the range of available output power.

One of the following TI values display on the screen based on the application and type of tissue.

- Soft Tissue Thermal Index (TIS)
- Bone Thermal Index (TIB)
- Cranial Bone Thermal Index (TIC)

The TI and MI are displayed all the times. The MI and TI display start at a value of 0.4 and increments in steps of 0.1 (values less than 0.4 are displayed as < 0.4).

WARNING

Be sure to have read and understood control explanations for each mode used before attempting to adjust the power control or any control that can affect Acoustic Output.

Controls affecting acoustic output

The potential for producing mechanical bioeffects (MI) or thermal bioeffects (TI) can be influenced by certain controls. The power control has the most significant effect on Acoustic Output. Indirect effects may occur when adjusting controls.

Controls that can influence MI and TI are detailed under the bioeffects portion of each control in the Image chapter. Always observe the acoustic output display for possible effects.

To minimize exposure time and keep ultrasound levels low, operate your system by using the ALARA (As Low As Reasonably Achievable) principle, increasing output only when you needed to obtain diagnostic image quality. It is recommended that all users receive ALARA training program. The ALARA training program by ALPINION application specialists provides you with basic ultrasound principles, possible biological effects, the derivation and meaning of the indices, ALARA principles, and examples of specific applications of the ALARA principle.

Principle of ALARA

The principle of ALARA, which stands for As Low As Reasonably Achievable, is to keep the radiation exposure at the minimum level necessary to obtain the diagnostic information. This principle is widely practiced in medical x-ray protection where exposure at any level is potentially harmful. Historically, ALARA was initiated as a cautious approach for dealing with uncertain hazards but has since become the principle method for reducing the risk of injury from hazards that do not have safe minimum threshold.

While no minimum thresholds for harmful bioeffects have been established with the use of diagnostic ultrasound, the principle of ALARA can be readily implemented on equipment incorporating an output display. As the operator adjusts the equipment to optimize the image quality, the display interactively updates to indicate the effect on output.

Controls that have no noticeable impact on image quality should be set to minimize the output while controls that improve the image quality and also increase acoustic output should be set no higher than needed to achieve a diagnostic quality image.

Transducer/Mode combination summary

System: minisono ultrasound system

NA: Not Applicable

	Mode of Operatio						
Transducer Model	**B**	**M**	**PWD**	**CWD**	**Color Doppler**	**Combined (Specify)**	**Other (Specify)**
minisono C1-6	O	O	O	NA	O	NA	NA
minisono L3-12	O	O	O	NA	O	NA	NA

Display resolution and measurement accuracy

When a transducer is capable of exceeding a mechanical or thermal index of 1.0, the ultrasound imaging system displays indices starting from 0.4 in increments of 0.1 for all displayed values.

A number of factors contribute to the estimation error for the displayed index. Variation among transducers and systems, approximation for real-time index calculations, and measurement errors contribute to the index display error. Measurement precision for ultrasonic intensities, pressure, center frequency, & power is within 10%, 6%, 7% and 10% respectively. The total estimated display accuracy is +/-15% for MI and +/-30% for TI. Definitions for these parameters can be found in the AIUM/NEMA document entitled Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment (also known as the Output Display Standard)

Default Displayed MI and TI Values by Transducer
(Per transducer/mode that exceeds default MI or TI value of 0.4)

General Imaging

	Mode of Operation									
Transducer	**B**		**M**		**PW**		**BC**		**THI**	
	MI	**TI**	**MI**	**TI**	**MI**	**TI**	**MI**	**TI**	**MI**	**TI**
minisono C1-6	-	- - 0.5	-	- - 0.5	0.4	0.7 1.2 1.0	0.4	0.4 0.4 1.3	0.5	- - 1.3
minisono L3-12	0.5	- - -	0.5	- - -	0.9	- 1.2 0.5	1.0	- - 0.7	0.5	- - -

S: Soft Tissue Index, B: Bone Thermal Index, C: Cranial Thermal Index

Transducer Temperature

The system limits patient contact temperature to 43°C (simulated use), and acoustic output values to their respective U.S. Food and Drug Administration limits. If the surface temperature of your transducer reaches a safe level 43 °C, the image is frozen automatically, preventing overheating of the transducer surface and limiting acoustic output. And if the surface temperature of your transducer reaches over 47 °C, the system shuts down automatically, and the "Auto shut down" appears on the display.

Transducer surface temperature limits

Transducer Model	Maximum Temperature (°C)	
	Tissue Mimicking Material (TMM)	Still Air
minisono C1-6	27.0	38.9
minisono L3-12	28.0	39.4

Output range summary format

Transducer Model: C1-6

System: minisono

	Mode of Operation						
Global Maximum Output Levels (est.)	**B**	**M**	**PWD**	**CWD**	**Color Doppler**	**Combined (Specify)**	**Other (Specify)**
Max $I_{SPTA.3}$	6.54	6.54	162	NA	51.6	NA	NA
Min $I_{SPTA.3}$	0.63	0.63	5.70	NA	3.10	NA	NA
Max MI (or $I_{SPPA.3}$)	0.34	0.34	0.49	NA	0.47	NA	NA
Min MI (or $I_{SPPA.3}$)	0.19	0.19	0.21	NA	0.15	NA	NA
Max TIS	0.15	0.15	2.25	NA	0.65	NA	NA
Min TIS	0.10	0.10	0.13	NA	0.12	NA	NA
Max TIB	0.15	0.15	2.79	NA	0.65	NA	NA
Min TIB	0.10	0.10	0.11	NA	0.12	NA	NA
Max TIC	1.60	1.60	4.19	NA	1.95	NA	NA
Min TIC	0.10	0.10	0.22	NA	0.13	NA	NA

NA : Not Applicable
Color Doppler : Include simultaneous BC mode, PD mode and Directional PD mode.
Combined : Include simultaneous BD mode, BCD mode, BPD mode and Color M mode.
M : Include simultaneous Anatomical M mode.
PWD : Include simultaneous High PRF Doppler mode.

Transducer Model: L3-12

System: minisono

	Mode of Operation						
Global Maximum Output Levels (est.)	**B**	**M**	**PWD**	**CWD**	**Color Doppler**	**Combined (Specify)**	**Other (Specify)**
Max $I_{SPTA.3}$	43.0	43.0	399	NA	118	NA	NA
Min $I_{SPTA.3}$	1.82	1.82	5.07	NA	3.89	NA	NA
Max MI (or $I_{SPPA.3}$)	0.67	0.67	0.60	NA	0.67	NA	NA
Min MI (or $I_{SPPA.3}$)	0.31	0.31	0.21	NA	0.26	NA	NA
Max TIS	0.52	0.52	3.39	NA	0.72	NA	NA
Min TIS	0.21	0.21	0.51	NA	0.19	NA	NA
Max TIB	0.52	0.52	2.59	NA	0.72	NA	NA
Min TIB	0.21	0.21	0.13	NA	0.19	NA	NA
Max TIC	4.07	4.07	4.16	NA	1.86	NA	NA
Min TIC	0.20	0.20	0.11	NA	0.57	NA	NA

NA : Not Applicable
Color Doppler : Include simultaneous BC mode, PD mode and Directional PD mode.
Combined : Include simultaneous BD mode, BCD mode, BPD mode and Color M mode.
M : Include simultaneous Anatomical M mode.
PWD : Include simultaneous High PRF Doppler mode.

Acoustic output reporting table

System: minisono C1-6

Operating Mode: B Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						$A_{aprt}\leq 1$	$A_{aprt}>1$		
Global Maximum: Index Value				0.34	0.15	-	-	-	1.60
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	0.53					
	P	W_0	mW		39.4	-		-	36.8
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(z_1)$, $ITA_{.3}(z_1)$)					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	3.30					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	2.45	3.03	-	-	-	2.87
	Dim of A_{aprt}	X	cm		0.77	-	-	-	0.19
		Y	cm		1.35	-	-	-	1.35
Other Information	t_d	PD	µsec	0.54					
	prr	PRF	Hz	3840					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	0.74					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		8.00	-	-		1.50
		FL_Y	cm		7.50	-	-		7.50
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	15.4					
Operating Control Conditions	Frequency		MHz	2.50	3.50	-	-	-	3.50
	Focal Zone		cm	4.60	8.00	-	-	-	1.50
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			B	B	-	-	-	B

System: minisono C1-6

Operating Mode: THI Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						A_{aprt}≤1	A_{aprt}>1		
Global Maximum: Index Value				0.51	0.20	-	-	-	2.01
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	0.77					
	P	W_0	mW		54.6	-		-	46.1
	min of [$P_{\alpha}(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(Z_1)$, $ITA_{.3}(z_1)$]					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	3.00					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	2.31	2.21	-	-	-	2.15
	Dim of A_{aprt}	X	cm		0.77	-	-	-	0.19
		Y	cm		1.35	-	-	-	1.35
Other Information	t_d	PD	µsec	0.89					
	prr	PRF	Hz	2190					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	0.98					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		23.0	-	-		1.50
		FL_Y	cm		7.50	-	-		7.50
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	21.2					
Operating Control Conditions	Frequency		MHz	2.20	2.00	-	-	-	2.00
	Focal Zone		cm	4.60	23.0	-	-	-	1.50
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			THI	THI	-	-	-	THI

System: minisono C1-6

Operating Mode: BC Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						$A_{aprt}\leq 1$	$A_{aprt}>1$		
Global Maximum: Index Value				0.47	0.65	-	-	-	1.95
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	0.74					
	P	W_0	mW		62.2	-		-	54.2
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(z_1)$, $ITA_{.3}(z_1)$)					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	3.60					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	2.52	2.51	-	-	-	2.02
	Dim of A_{aprt}	X	cm		0.77	-	-	-	0.29
		Y	cm		1.35	-	-	-	1.35
Other Information	t_d	PD	µsec	1.46					
	prr	PRF	Hz	2130					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	1.00					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		8.00	-	-		1.50
		FL_Y	cm		7.50	-	-		7.50
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	24.5					
Operating Control Conditions	Frequency		MHz	2.50	2.50	-	-	-	2.00
	Focal Zone		cm	4.60	8.00	-	-	-	1.50
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			BC	BC	-	-	-	BC

System: minisono C1-6

Operating Mode: D, M Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						A_{aprt}≤1	A_{aprt}>1		
Global Maximum: Index Value				0.49	-	2.25	-	2.79	4.19
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	0.78					
	P	W_0	mW		-	75.8		96.3	118
	min of [$P_{\alpha}(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(Z_1)$, $ITA_{.3}(z_1)$]					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					3.60	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	3.60					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					0.64	
	f_{awf}	f_c	MHz	2.52	-	2.99	-	2.52	2.50
	Dim of A_{aprt}	X	cm		-	0.29	-	0.62	0.29
		Y	cm		-	1.35	-	1.35	1.35
Other Information	t_d	PD	μsec	1.46					
	prr	PRF	Hz	4130					
	p_r at max I_{pi}	$P_r@PII_{max}$	MPa	1.05					
	d_{eq} at max I_{pi}	$d_{eq}@PII_{max}$	cm					0.61	
	Focal length	FL_X	cm		-	1.50	-		1.50
		FL_Y	cm		-	7.50	-		7.50
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}@MI_{max}$	W/cm²	26.9					
Operating Control Conditions	Frequency		MHz	2.50	-	3.00	-	2.50	2.50
	Focal Zone		cm	4.60	-	1.50	-	4.60	1.50
	Sample Volume Size		cm	0.80	-	0.80	-	0.80	0.80
	Power		%	100	-	100	-	100	100
	Mode Type			D Only	-	D Only	-	D Only	D Only

System: minisono L3-12

Operating Mode: B Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						$A_{aprt}\leq 1$	$A_{aprt}>1$		
Global Maximum: Index Value				0.67	0.52	-	-	-	4.07
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	1.66					
	P	W_0	mW		45.7	-		-	47.7
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [($W_{.3}(z_1)$, $ITA_{.3}(z_1)$)					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	1.20					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	6.20	6.88	-	-	-	6.86
	Dim of A_{aprt}	X	cm		0.24	-	-	-	0.15
		Y	cm		0.45	-	-	-	0.45
Other Information	t_d	PD	µsec	0.23					
	prr	PRF	Hz	3840					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	2.08					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		1.70	-	-		1.00
		FL_Y	cm		2.00	-	-		2.00
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	160					
Operating Control Conditions	Frequency		MHz	6.00	7.50	-	-	-	7.50
	Focal Zone		cm	1.70	1.70	-	-	-	1.00
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			B	B	-	-	-	B

System: minisono L3-12

Operating Mode: THI Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						A_{aprt}≤1	A_{aprt}>1		
Global Maximum: Index Value				0.51	0.51	-	-	-	4.57
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	1.23					
	P	W_0	mW		47.9	-		-	47.9
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(Z_1)$, $ITA_{.3}(z_1)$]					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	1.50					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	5.82	5.82	-	-	-	5.82
	Dim of A_{aprt}	X	cm		0.21	-	-	-	0.12
		Y	cm		0.45	-	-	-	0.45
Other Information	t_d	PD	μsec	0.64					
	prr	PRF	Hz	1920					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	1.65					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		1.70	-	-		1.00
		FL_Y	cm		2.00	-	-		2.00
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	69.3					
Operating Control Conditions	Frequency		MHz	5.60	5.60	-	-	-	5.60
	Focal Zone		cm	3.70	1.70	-	-	-	1.00
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			THI	THI	-	-	-	THI

System: minisono L3-12

Operating Mode: BC Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						$A_{aprt}\leq 1$	$A_{aprt}>1$		
Global Maximum: Index Value				0.67	0.72	-	-	-	1.86
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	1.68					
	P	W_0	mW		28.0	-		-	28.0
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(z_1)$, $ITA_{.3}(z_1)$)					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					-	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	1.40					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					-	
	f_{awf}	f_c	MHz	6.21	5.19	-	-	-	5.19
	Dim of A_{aprt}	X	cm		0.30	-	-	-	0.30
		Y	cm		0.45	-	-	-	0.45
Other Information	t_d	PD	µsec	0.22					
	prr	PRF	Hz	3840					
	p_r at max I_{pi}	P_r@PII_{max}	MPa	2.26					
	d_{eq} at max I_{pi}	d_{eq}@PII_{max}	cm					-	
	Focal length	FL_X	cm		2.00	-	-		2.00
		FL_Y	cm		2.00	-	-		2.00
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}$@MI_{max}	W/cm²	172					
Operating Control Conditions	Frequency		MHz	6.00	5.00	-	-	-	5.00
	Focal Zone		cm	2.00	2.00	-	-	-	2.00
	Sample Volume Size		cm	-	-	-	-	-	-
	Power		%	100	100	-	-	-	100
	Mode Type			BC	BC	-	-	-	BC

System: minisono L3-12

Operating Mode: D, M Mode

Index Label				MI	TIS			TIB	TIC
					scan	non-scan		non-scan	
						$A_{aprt}\leq 1$	$A_{aprt}>1$		
Global Maximum: Index Value				0.60	-	3.39	-	2.59	4.16
	IEC	FDA	Units						
Associated Acoustic Parameter	P_{ra}	$P_{r.3}$	MPa	1.49					
	P	W_0	mW		-	87.4		54.5	87.4
	min of [$P_\alpha(z_s)$, $I_{ta.\alpha}(z_s)$]	min of [$(W_{.3}(Z_1)$, $ITA_{.3}(z_1)$]					-		
	z_s	z_1	cm				-		
	z_{bp}	z_{bp}	cm				-		
	z_b	z_{sp}	cm					1.00	
	z at max $I_{pi,\alpha}$	z_{sp}	cm	1.40					
	$d_{eq}(z_b)$	$d_{eq}(z_{sp})$	cm					1.46	
	f_{awf}	f_c	MHz	6.16	-	5.80	-	5.17	5.80
	Dim of A_{aprt}	X	cm		-	0.48	-	0.48	0.48
		Y	cm		-	0.45	-	0.45	0.45
Other Information	t_d	PD	µsec	0.60					
	prr	PRF	Hz	930					
	p_r at max I_{pi}	$P_r@PII_{max}$	MPa	1.96					
	d_{eq} at max I_{pi}	$d_{eq}@PII_{max}$	cm					1.22	
	Focal length	FL_X	cm		-	3.70	-		3.70
		FL_Y	cm		-	2.00	-		2.00
	$I_{pa.\alpha}$ at max MI	$I_{PA.3}@MI_{max}$	W/cm²	105					
Operating Control Conditions	Frequency		MHz	6.00	-	5.50	-	5.00	5.50
	Focal Zone		cm	1.70	-	3.70	-	6.80	3.70
	Sample Volume Size		cm	1.00	-	1.00	-	1.00	1.00
	Power		%	100	-	100	-	100	100
	Mode Type			D Only	-	D Only	-	D Only	D Only

USER MANUAL

minisono L3-12/C1-6

Rev. 7 (ENG)

ALPINION

MEDICAL SYSTEMS

www.alpinion.com