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considered one compensation factor between 0.5 and 1.0.

**Other measurement setting folder in PW mode**

Other measurement setting folders use the same approach as the “General” measurement setting. Refer to the “General” measurement folder setting.

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## 10.2 Abdominal measurements

Brief introduction:

Based on different applications, abdominal measurement provides several different types of measurement options:

- General abdomen
- Difficult abdomen
- Kidney
- Renal vessel
- Abdominal trauma

### 10.2.1 2D mode measurements

The measurement menu in the “Abdominal” application includes generic measurement and specific measurement, such as aorta diameter, renal length, and renal volume.

In 2D mode, generic measurement in abdominal application covers the following criteria:

- Depth
- Distance
- Volume
- Angle
- Stenosis
- A and B ratio

Refer to the “General” measurement for more detail on those measurements.

In “B” mode, specific measurements in the abdominal application include the following items:

#### **Aorta diameter**

Aorta diameter can be measured by single distance measurement. The steps are as follows:

1. Press “Measure”.
2. Select “Aorta Diameter”, then a caliper will display on the image screen
3. Move the trackball to position the caliper in the start point.
4. Press “Enter” to fix the start point. The second active caliper will display.
5. Move the trackball to position the second caliper in the end point.
6. Press “Enter” to complete the measurement. The system will display the aorta diameter result in the results window.

#### **Renal Length**

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Renal length can be measured by single distance measurement. The steps are as follows:

1. Press "Measure".
2. Select certain direction of Renal Length (left or right), then a caliper will display on the image screen
3. Move the trackball to position the caliper in start point.
4. Press "Enter" to fix the start point. The second active caliper will display.
5. Move the trackball to position the second caliper in the end point.
6. Press "Enter" to complete the measurement. The system will display the renal length result in the results window.

### **Renal Volume**

Renal volume is normally measured by the three-distance method. The steps are as follows:

1. Press "Measure".
2. Select a certain direction of Renal Volume (left or right), and then a caliper will display on the image screen

Note: Three distances can be measured in the dual image display format. The first measurement can be processed in the midsagittal plane, and the second measurement can be processed in the axial plane. To use dual image display format, press "Left" or "Right".

3. Proceed with the single and dual distance measurement.
4. The system will display three distances and the renal volume result in the results window.

### **Spleen volume**

Spleen volume is normally measured by the three distance method. The steps are as follows:

1. Press "Measure".
2. Three distances can be measured in the dual image display format. The first measurement can be processed in the midsagittal plane, and the second measurement can be processed in the axial plane. To use the dual image display format, press "Left" or "Right".
3. Proceed with the single and dual distance measurement.
4. The system will display three distances and the spleen volume result in the results window.

### **Bladder volume**

There are 2 methods to measure bladder volume: Manual and Auto.

The steps are as follows with "Manual":

1. Press "Measure" key.
2. Select "Bladder Volume", and then a caliper will display on the image screen

Note: Three distances can be measured in the dual image display format. The first measurement can be processed in the midsagittal plane, and the second

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measurement can be processed in the axial plane. To use the dual image display format, press “Left” or “Right”.

3. Proceed with the single and dual distance measurement.

4. The system will display three distances and the bladder volume result in the results window.

Auto method:

1. Press “Measure” key.

2. Select “Bladder Volume” in “Config” page, touch “Auto”.

3. Save and exit.

4. Move the cursor to the image, press “Enter” key.

5. Unfreeze the system, change scanning section, enter measure again, and press “Enter” key.

6. The system will get the result of bladder volume automatically.

### **Prostate volume**

Prostate volume is normally measured by the three distance method. The steps are as follows:

1. Press “Measure”.

2. Select Prostate, and then a caliper will display on the image screen.

Note: Three distances can be measured in dual image display format. The first measurement can be processed in the midsagittal plane, and the second measurement can be processed in axial plane. To use the dual image display format, press “Left” or “Right”.

3. Proceed with the single and dual distance measurement.

4. The system will display three distances and the prostate volume result in the results window.

The number of measurement items in “B” mode can be added to or reduced based on each operator’s measurement requirements. Refer to the measurement setting for how to set measurements in detail.

## **10.2.2 M mode measurements**

In “M” mode, the measurement menu includes these measurement items:

- Stenosis
- A and B ratio
- Heart Rate

Refer to the Generic measurement in detail for those measurements.

Measurement items in the measurement setting menu can be added to or reduced based the operator’s requirements. Refer to “M” mode measurement

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setting information in detail.

### 10.2.3 PW mode measurements

In “PW” mode, the measurement menu includes these measurement folders:

- Generic measurement folder
- Aorta measurement folder
- Common hepatic artery measurement folder
- Renal artery measurement folder
- Renal vein measurement folder
- Postcava measurement folder
- Superior mesentery artery measurement folder

Increase or reduce measurement items in the measurement setting menu based on their own requirement. Refer to “PW” mode measurement setting information in detail.

#### Generic measurement folder

In “PW” mode, the generic measurement folder includes items as follows:

- Velocity
- PS (systole peak speed)
- ED (diastole end speed)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- PI (Pulsatility index)
- RI (resistance index)
- PS/ED
- ED/PS
- A/B ratio
  - Velocity
  - Time
  - Acceleration
- HR

Refer to the Generic measurement in detail for those measurements.

Increase or reduce measurement items in the measurement setting menu based on their own requirement. Refer to “M” mode measurement setting information in detail.

#### Measurement folder for other anatomic structure

In “PW” mode, other measurement folders based on an atomic structure include measurement items as follows:

- 
- Velocity
  - PS (systole peak speed)
  - ED (Diastole end speed)
  - PI (Pulsatility index)
  - RI (Resistance index)

Increase or reduce measurement items in the measurement setting menu based on requirements. Refer to “PW” mode measurement setting information in detail.

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## 10.3 Small organ measurements

### Brief introduction

Based on different applications, small organ measurement provides several different measurement options:

- Thyroid
- Breast
- Testis
- Musculoskeletal
- Upper and lower extremity joint
- Nerve block

### 10.3.1 2D mode measurements

The small organ application measurement menu includes generic measurement and specific measurement, such as length of thyroid isthmus, thyroid, volume, testis volume, etc.

In “B” mode, generic measurement in small part application includes measurement items as follows:

- Distance
- Volume
- Stenosis

Refer to the generic measurement for more details.

In “B” mode, the specific measurement in small part application includes measurement items as follows:

#### **Length of thyroid isthmus**

Length of thyroid isthmus can be measured by a single distance. The steps are as follows:

1. Press “Measure”.
2. Select “AP” (Length of thyroid isthmus), and an active tracing caliper will display on the image screen.
3. Move the trackball to position the caliper at the start point.
4. Press “Enter” to fix the start point. The second caliper will display on the image screen.
5. Move the trackball to position the end point. If it has a relevant system measurement preset, a dotted line connects the two measurement points.
6. Press “Enter” to complete the measurement. The system will display length of thyroid isthmus in the results window.

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### **Thyroid volume**

Thyroid volume is normally measured by the three distances method. The steps are as follows

1. Press “Measure”.
2. Select proper direction (left or right) Thyroid Volume. An active tracing caliper will display on the image screen

Note: The three distances can be measured in the dual image display format. First measurement can be processed in the midsagittal plane, and the second measurement can be processed in axial plane. To use dual image display format, press “Left” or “Right” .

3. Proceed with the single and dual distance measurement.
4. The system will display distance and thyroid volume in the results window.

### **Testicle Volume**

Testicle volume is normally measured by the three distances method. The steps are as follows

1. Press “Measure”.
2. Select proper direction (left or right) Testicle Volume. An active tracing caliper will display on the image screen

Note: The three distances can be measured in dual image display format. First measurement can proceed in the midsagittal plane, and the second measurement can proceed in axial plane. To use dual image display format, press “Left” or “Right”

3. Proceed with the single and dual distance measurement.
4. The system will display distance and thyroid volume in the results window.

Increase or reduce measurement items in the measurement setting menu based on their own requirements. Refer to “B” mode measurement setting information in detail.

### **Lung Auto Analysis**

Lung Auto analysis only works with ICU package under the lung application. The steps are as follows:

1. Choose Linear/ Convex/ Phased probes
2. Choose lung application and touch Lung Auto analysis to get into the feature
3. Touch Auto Pleura to start auto pneumothorax measurement.

## **10.3.2 M mode measurements**

In “M” mode, the measurement menu includes these measurement items:

- Depth



- 
- Distance

Refer to the Generic measurement in detail for those measurements.

Increase or reduce measurement items in the measurement setting menu based on their own requirements. Refer to “M” mode measurement setting information in detail.

### 10.3.3 PW mode measurements

In PW mode, measurements include these measurement folders:

- Generic measurement folder
- Vessel measurement folder

Increase or reduce measurement items in the measurement setting menu based on their own requirement. Refer to “PW” mode measurement setting information in detail.

#### Generic measurement folder

In “PW” mode, the general measurement folder includes these measurement items:

- Velocity
- PS (systole peak speed)
- ED (diastole end speed)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- PI (Pulsatility index)
- RI (resistance index)
- PS/ED
- ED/PS
- A/B ratio
  - Velocity
  - Time
  - Acceleration
- FLOWVOL (flow volume)
- Max PG (Maximum pressure gradient)
- Mean PG (Mean pressure gradient)
- SV-D (Stroke Volume)
  - SV Diam (stroke volume diameter)
  - SVTAMAX (stroke volume maximum speed in time average)

Refer to the Generic measurement in detail for “PW” measurements.

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### **Vessel measurement folder**

In “PW” mode, the vessel measurement folder normally includes these items:

- Velocity
- PS (systole peak speed)
- ED (diastole end speed)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- PI (Pulsatility index)
- RI (resistance index)
- PS/ED
- ED/PS

Increase or reduce measurement items in the measurement setting menu based on their own requirements. Refer to the “PW” mode measurement setting information in detail.

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## 10.4 Vessel measurements

### Brief introduction

Based on different applications, vessel measurement provides several different measurement items:

- Carotid artery
- Upper artery
- Upper vein
- Lower artery
- Lower vein
- Vessel puncture
- Trans-cranial Doppler

### 10.4.1 2D mode measurements

In the vascular application measurement menu includes generic measurement and specific measurements, such as vessel wall intima-media thickness etc.

In “B” mode, generic measurements in the vessel application include measurements as follows:

- Depth
- Distance
- Stenosis
- A and B ratio

In “B” mode, specific measurements in the vessel application include measurement items as follows:

#### **IMT (intima-media thickness) measurement**

Intima-media average thickness can be measured to be the index of arteriosclerosis.

Note: Due to the character of the ultrasound image principle, the rear wall IMT measurement is more accurate than antetheca.

#### **Manual IMT measurement**

The steps are as follows

1. Select “Manual” method for “Ant.CCA IMT” or “Post.CCA IMT” (carotid artery intima-media thickness) in measure config page.
2. Scan the carotid artery to gain relevant good image quality and press

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“Freeze”.

3. Press “Zoom” once, to amplify the image in order to identify vessel intima, media, and extima.
4. Press “Measure”.
5. Select the proper direction (left or right and rear wall or antetheca) “CCA IMT”.
6. Use the trackball to move caliper and trace extima inter-side of carotid artery. Press “Enter” to fix the first caliper and the system display another operating caliper.
7. Use the trackball to move the caliper and trace intima inter-side of carotid artery.
8. Press “Enter” to complete the measurement. The system will automatically calculate vessel wall intima-media average thickness for tracing part.

### **Auto IMT measurement**

Auto IMT measurement means to measure the intima thickness of far field and near field vessel wall. Intima thickness of near field means the distance between extima and intima. Intima thickness of far field means the distance between extima and intima in far field.

The steps are as follows:

1. Select “Auto” method for “Ant.CCA IMT” or “Post.CCA IMT” (carotid artery intima-media thickness) in measure config page.
2. Scan carotid artery to gain relevant good image quality and press “Freeze”.
3. Press “Zoom” once, to amplify the image in order to identify the vessel intima, media, and extima.
4. Press “Measure”.
5. Select the proper direction (left or right and rear wall or antetheca) CCA IMT.
6. Move the trackball to draw one rectangle, make sure that one section of the intima is inside the rectangle.
7. Press “Enter” to complete the measurement. The system will display the measurement result about intima-media thickness as follows:
  - Average
  - Max
  - Min
  - Standard Deviation
  - Valid Points

### **CCA IMT**

The steps are as follows:

1. Scan carotid artery to gain relevant good image quality and press “Freeze”.
2. Press “Zoom” once, to amplify the image in order to identify the vessel intima, media, and extima.
3. Press “Measure”. Select “CCA IMT R” or “CCA IMT L”.

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4. Move the trackball to draw one rectangle, make sure that one section of the artery (both rear wall and antetheca are included) is inside the rectangle.

5. Press “Enter” to complete the measurement. The system will display the measurement result about intima-media thickness as follows:

- Average
- Max
- Min
- Standard Deviation
- Valid Points

### **Live IMT**

Only works with carotid applications. The measure results include following values: IMT Average, IMT Max, IMT Min, SD, ROI Len, Measure Len and Valid Points.

The ROI size and position can be edited to improve correctness for IMT results. The CCA sides, such as Left CCA, and Right CCA also can be set. Users can set vessel walls. If posterior wall is set, the system will detect posterior vessel wall, and the result only displayed posterior IMT values.

### **Vas Plaque (Vascular sclerosis atheromatous plaque grade)**

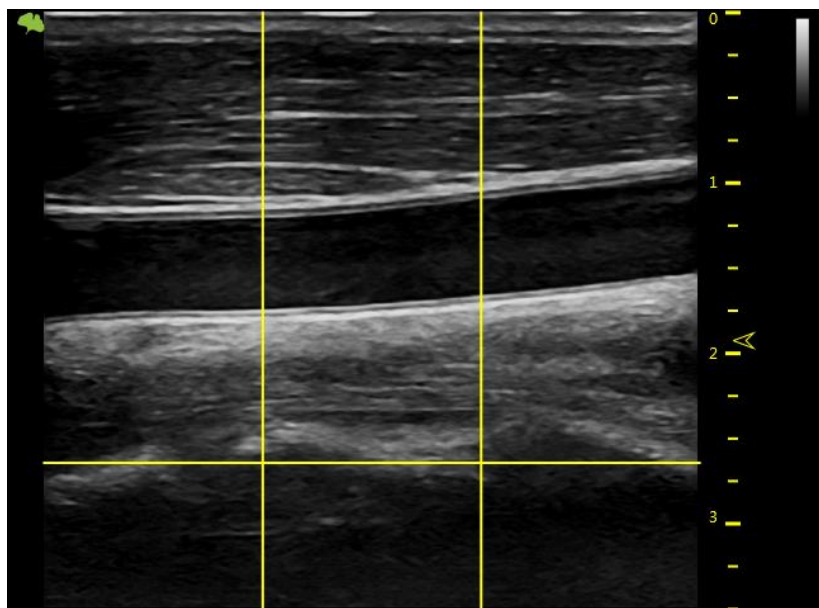
The steps are as follows:

1. Scan carotid artery to gain a good image quality and then press “Freeze”.
2. Press “Zoom” once, to amplify the image in order to identify vessel intima, media, and extima.
3. Press “Measure”.
4. Select “Vas Plaque”.

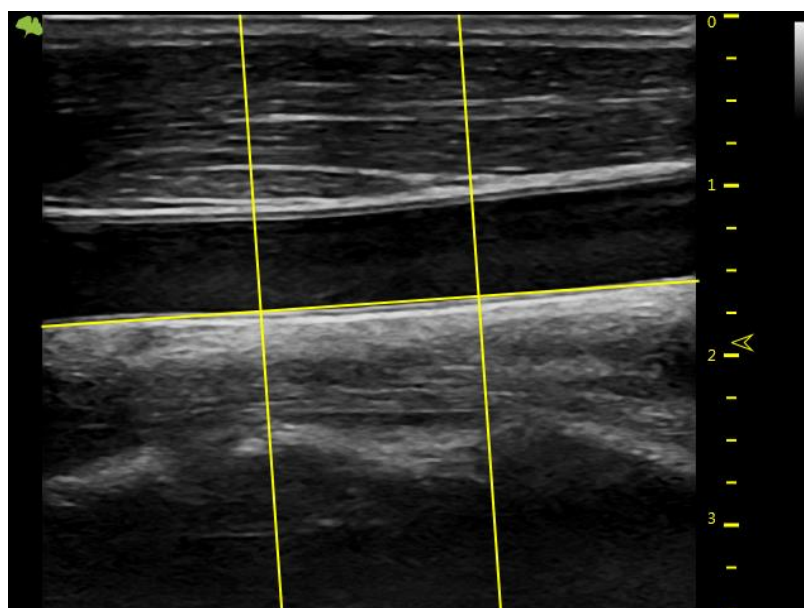
5. Input and select Vas Plaque measurement parameter:

- Change the assigned area number and vascular wall limited thickness. Factory default setting is 3 and limited thickness is 1.0 cm
- Select displayed measurement result parameter in configuration page:
  - Maximum value in each area
  - Average value in each area
  - Variance yield in each area
  - Maximum value in all measurements
  - Average value in all measurements
  - Variance yield in all measurements

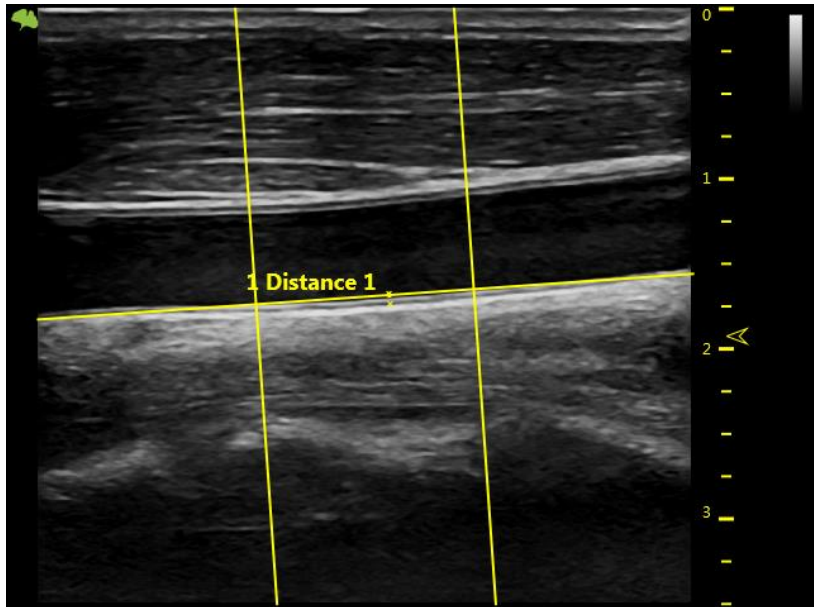
6. After complete the setting, press “Back” to return to the measurement menu. The system will display a horizontal line and several vertical lines. The number of vertical lines is determined by assigned areas. The interval line divides the whole image area equally.



7. Use the trackball and “Rotation/Steer” key to adjust the horizontal line in order to be parallel with vascular wall. Press “Enter” to complete the adjustment. The system will display another caliper.



8. Use the trackball to move the caliper and press “Enter” in order to measure the thickness in any place as required.



9. The system displays the following measurement and calculation results:

- All measurement results
- Display all parameters which are set in setting menu
- Maximum value in each area
- Average value in each area
- Variance yield in each area
- Maximum value in all measurements
- Average value in all measurements
- Variance yield in all measurements

The number of all measurement points which exceed vascular wall limitation and the number of all areas which exceed vascular wall limitation.

#### 10.4.2 M mode measurements

In “M” mode, measurement menu includes measurement items as follows:

- Depth
- Distance
- Stenosis
- A and B ratio
- Heart rate

Refer to the Generic measurement in detail for those measurements.

Increase or reduce measurement items in the measurement setting menu based on their own requirements. Refer to “M” mode measurement setting information in detail.

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### 10.4.3 PW mode measurements

In “PW” mode, measurement menu include measurement folders as follows:

- Generic measurement folder
- Arteria carotid communis measurement folder
- Internal carotid measurement folder
- External carotid measurement folder
- VA measurement folder
- BULB measurement folder
- BIF measurement folder
- STA measurement folder
- InnomA measurement folder
- Middle cerebral artery measurement folder
- Posterior cerebral artery measurement folder

Increase or reduce measurement items in the measurement setting menu based on their own requirements. Refer to “PW” mode measurement setting information in detail.

#### **Generic measurement folder**

In “PW” mode, the general measurement folder includes items as follows:

- Velocity
- Time
- Acceleration
- PS (systole peak speed)
- ED (diastole end speed)
- MD (Minimum speed in diastole period)
- TAMAX (maximum speed in time average)
- TAMEAN (mean speed in time average)
- PI (Pulsatility index)
- RI (resistance index)
- PS/ED
- ED/PS
- A/B ratio
  - Velocity
  - Time
  - Acceleration
- FLOWVOL (flow volume)
- HR

#### **Other vascular measurement folder:**

In “PW” mode, the vascular measurement folder includes measurement items as follows:

- Velocity



- 
- Time
  - Acceleration
  - PS (systole peak speed)
  - ED (diastole end speed)
  - MD (Minimum speed in diastole period)
  - TAMAX (maximum speed in time average)
  - TAMEAN (mean speed in time average)
  - PI (Pulsatility index)
  - RI (resistance index)
  - PS/ED
  - ED/PS
  - A/B ratio
    - Velocity
    - Time
    - Acceleration
  - FLOWVOL (flow volume)
  - HR

Increase or reduce measurement items in the measurement setting menu based on their own requirement. Refer to the “PW” mode measurement setting information in detail.

### **Vessel automatically tracing and measurement**

The vessel auto tracing and measurement function can automatically detect and identify the heart cycles. For artery flow, it can automatically identify the “PS” (peak speed in systole period), “MD” (minimum speed in diastole) and “ED” (end speed in diastole), and then automatically calculate the “PI” (pulsatility index) and “RI” (resistance index). For vein flow, it can automatically detect the peak velocity (PV).

#### **Activate vessel auto tracing and measurement**

The system supports auto tracing and measurement during live scanning, freeze and cine loop.

To activate auto tracing and measurement function, select the Live option in the “Auto Trace” menu of the touch panel in “PW” mode (automatically display auto tracing and measurement in real scanning image) or the “Frozen” option (automatically display auto tracing and measurement in frozen image). To stop vascular auto tracing and measurement, select “Off”.

#### **Set vascular auto tracing and measurement parameter**

- Select vascular auto tracing method.
- Select maximum or average speed continuous trace.
- Select Max or Mean in “Trace Method” menu on the touch panel
- Select tracing direction.

- 
- Tracing detection can be used in above baseline, below baseline or combination (above, below) peak velocity data. Select “Above”, “Below” or “Both” in the “Trace Direction” menu in order to set peak velocity data.

### **Set vascular auto tracing and measurement result**

After selecting the Dynamic or Static option in the “Auto trace” menu in “PW” mode, the operator can set which measurement and calculation results will be displayed in the vascular auto tracing and measurement result window. The following parameters can be selected: PS, MW, TAMAX, TAMEAN, TAMIN, PI, RI, PS/ED, ED/PS, PV and HR.

Note: PV is to detect peak velocity in vein flow. So it is mutually exclusive from other measurements. In other words, if PV is selected, other measurements will be isolated.

### **The following steps are to execute auto tracing and measurement**

1. Reboot system.
2. Proceed with scanning.
3. Activate the auto vascular tracing and measurement function (Dynamic or Static). The system will automatically execute tracing, measurement and calculation.

Note: Select in real time which measurement and calculation will be displayed in the auto vascular tracing and measurement result window through vascular auto tracing and measurement setting menu. Selectable parameters are PS, ED, MD, TAMAX, TAMEAN, TAMIN, PI, RI, PS/ED, ED/PS, PV and HR. PV is to detect peak velocity of vein flow. It is mutually exclusive of other measurements; that is, once PV is selected, other measurements are automatically isolated.

4. Press “Freeze”, all vascular measurement and calculation results will display in the results window.

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## 10.5 Gynecology Measurements

Introduction:

Gynecology measurements provide several types of measurement items:

- Uterus and Pelvis
- Follicle

### 10.5.1 2D Mode measurements

For Gynecology measurements, it includes general measurement items and some typical measurement items, such as Uterus Volume (Uterus), Ovary Volume(OV), Follicle Volume and Endometriosis Thickness(En.). For general measurements of 2D mode, it mainly includes “Depth” and “Distance” measurement items. Refer to chapter “General Measurements” in detail.

- Depth
- Distance

The typical measurement items of Gynecology application are as follows:

#### **UT(Uterus Volume)**

To calculate Uterus Volume, make three distance measurements. The steps are as follows:

1. Press “Measure”.
2. Select UT, and an active tracing caliper displays.
3. Perform a standard distance measurement. The system displays the distance value in the results window.
4. Repeat Step 3 to make the second and third distance measurement.

Note: Make three distance measurements in the dual display format by pressing the “Left”/ “Right” on the control panel.

5. After the third distance measurement is completed, the system displays the uterus volume in the results window.

#### **OV(Ovary Volume)**

To calculate Ovary Volume, make three distance measurements as normal. The steps are as follows:

1. Press “Measure”.
2. Select OV(L) or OV(R), and an active tracing caliper displays.
3. Perform a standard distance measurement. The system displays the distance value in the results window.
4. Repeat Step 3 to make the second and third distance measurement.

Note: Three distance measurements can be made in the dual display format by

pressing “Left”/ “Right” on the control panel.

5. After the third distance measurement is completed, the system displays the ovary volume in the results window.

### Follicle (Follicle Volume)

To measure Follicle Volume, the steps are as follows:

1. Press “Measure”.
2. Select “Follicle (L)” or “Follicle(R)”.
3. Select the measurement method as shown below menu or use the default one and an active tracing caliper displays.
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second and third distance measurement.

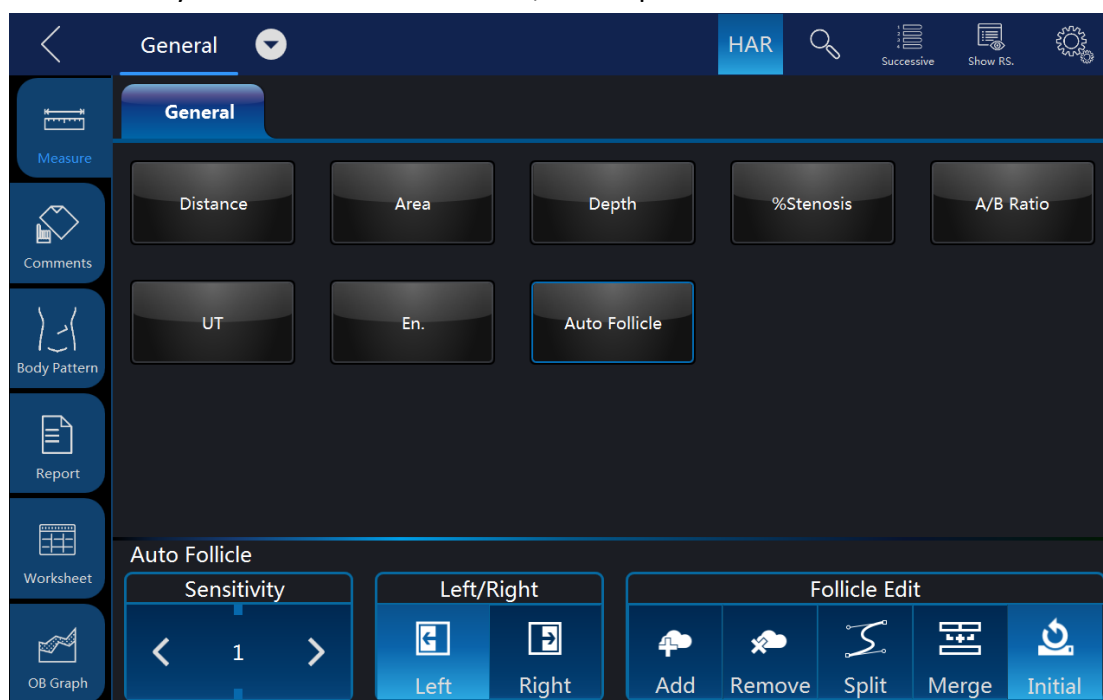
Notes:

Refer to chapter “General Measurements” for the single distance, dual distance and three distance measurement methods. As for “Mean” measurement method, three distance measurements are needed to calculate the follicle volume. Three distance measurements can be made in the dual display format by pressing “Left”/ “Right” on the control panel.

6. After the third distance measurement is completed, the system displays the follicle volume in the results window.

### Auto Follicle

Automatically measure follicular volume, the steps are as follows:



1. Press “Measure”.
2. Choose “Auto Follicle”.
3. Choose left or right.

- 
4. The system will automatically recognize the follicles, and automatically calculate the volume of follicles

### **Vaim (Follicle/ Uterus/ Pelvic)**

“Vaim” means intelligent measurement. The feature only can be used under these items: OB, Pelvic, Uterus, Follicle and Ped Hip.

To execute the Vaim measurements, the steps are as follows:

1. Choose the Follicle/ Uterus/ Pelvic application.
2. Touch “Vaim” press.
3. The results can be calculated automatically and shown in the screen.

### **En.(Endometriosis Thickness)**

To measure Endometriosis Thickness, the steps are as follows:

1. Press “Measure”.
2. Select “En.”, and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the endometriosis thickness in the results window.

### **Tumor Uterus**

To measure Tumor Uterus there are 6 methods: L, Ellipse, L&W, L&W&H, Ellipse&H, Trace&H.

### **Tumor Cervix**

To measure Tumor Cervix there are 6 methods: L, Ellipse, L&W, L&W&H, Ellipse&H, Trace&H.

### **Cervix L, Cervix W, Cervix H**

To measure Cervix L/W/H there are 4 methods: Distance, Polygon, Spline, Trace.

The measurement menu of Gynecology application can be configured by adding or removing the measurement items in “B” mode. Refer to “Measurement Menu Configuration” in the chapter “General Measurements” for how to configure of the measurement menu.

### **Ant. Pelvic(Rest) and Ant. Pelvic(Valsalva)**

To measure Ant. Pelvic(Rest) and Ant. Pelvic(Valsalva), the steps are as follows:

1. Press “Measure”.
2. Select “Ant. Pelvic(Rest)” or “Ant. Pelvic(Valsalva)”.
3. Determine the baseline.
4. Define the place of bladder neck (point U), the system will automatically calculate BSD.
5. Define the place of proximal urethra (point E), the system will automatically calculate UGA.

- 
6. Define the place of retrovesical wall (point R), the system will automatically calculate RVA.
  7. Define the place of bladder descend (point V), the system will automatically calculate BND.

After finished the above steps, the results of URA and BND will be calculated automatically.

### **Auto Levator Ani in 3D/ 4D mode**

To measure Auto Levator Ani, the steps are as follows:

1. Touch “Auto Levator Ani” press after click Measure button in 3D/ 4D mode.
2. Choose levator left or right, and then click the enter button.
3. The system will automatically recognize the levator, and automatically calculate the area, perimeter, LHLR, LHAP, Left LUG and Right LUG of levators.
4. The result will show on the screen.

## **10.5.2 PW mode measurements**

In “PW” mode of Gynecology application, it includes measurement folders as follows:

- General Measurement Folder
- Ao (Aorta) Measurement Folder
- Desc. Aorta Measurement Folder
- Umbilical Measurement Folder
- Placenta Measurement Folder
- Uterus Measurement Folder
- Follicle Measurement Folder
- MCA Measurement Folder

Configure the measurement menu of Gynecology application by adding or removing the measurement folders in “PW” mode. Refer to the “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.

### **General Measurement Folder**

In the General Measurement Folder, it includes measurement items as follows:

- Velocity
- PS
- ED
- MD
- TAMAX
- PI
- RI
- PS/ED

- 
- ED/PS
  - A/B Ratio
  - Velocity
  - Time
  - Acceleration
  - HR

#### Other Measurement Folders

In the other Measurement Folders, they include the measurement items as follows. It might have minor differences depending on the different factory settings.

- Velocity
- PS
- ED
- MD
- TAMAX
- PI
- RI
- PS/ED
- ED/PS
- A/B Ratio
- Velocity
- Time
- Acceleration
- HR

Configure the measurement menu of all measurement folders by adding or removing the measurement items in the measurement folders. Refer to the “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.

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## 10.6 Urology Measurements

### Introduction

Urology measurements provide several types of measurement items:

- Bladder
- Prostate
- Renal
- Kidney and ureter
- Pelvic Floor dysfunction

### 10.6.1 2D Mode measurements

Urology measurements include general measurement items and some typical measurement items, such as Bladder Volume, Renal Length, Renal Volume and Prostate Volume. General measurements in 2D mode include measurement items as follows. Refer to the chapter “General Measurements” in detail.

- Depth
- Distance
- Volume
- Angle
- Stenosis
- A/B Ratio

The typical measurement items of Urology application are as follows:

#### **Bladder volume**

There are 2 methods to measure bladder volume: Manual and Auto.

The steps are as follows with “Manual”:

1. Press “Measure” key.
2. Select “Bladder Volume”, and then a caliper will display on the image screen  
Note: Three distances can be measured in the dual image display format. The first measurement can be processed in the midsagittal plane, and the second measurement can be processed in the axial plane. To use the dual image display format, press “Left” or “Right”.
3. Proceed with the single and dual distance measurement.
4. The system will display three distances and the bladder volume result in the results window.

Auto method:



- 
1. Press "Measure" key.
  2. Select "Bladder Volume" in "Config" page, touch "Auto".
  3. Save and exit.
  4. Move the cursor to the image, press "Enter" key.
  5. Unfreeze the system, change scanning section, enter measure again, and press "Enter" key.
  16. 6. The system will get the result of bladder volume automatically.

### **Renal Length**

To measure Renal Length, the steps are as follows:

1. Press "Measure".
2. Select "Renal Len.(L)" or "Renal Len.(R)", and an active tracing caliper displays.
3. Perform a standard distance measurement. The system displays the renal length in the results window.

### **Renal Volume**

To calculate Renal Volume, make three distance measurements. The steps are as follows:

1. Press "Measure".
  2. Select "Renal Vol.(L)" or "Renal Vol.(R)", and an active tracing caliper displays.
  3. Perform a standard distance measurement. The system displays the distance value in the results window.
  4. Repeat Step 3 to make the second and third distance measurement.
- Note: Three distance measurements can be made in the dual display format by pressing "Left" / "Right".
5. After the third distance measurement is completed, the system displays the renal volume in the results window.

### **Prostate Volume**

To calculate Prostate Volume, make three distance measurements. The steps are as follows:

1. Press "Measure".
  2. Select "Prostate Vol.", and an active tracing caliper displays on the image screen
  3. Perform a standard distance measurement. The system displays the distance value in the results window.
  4. Repeat Step 3 to make the second and third distance measurement.
- Note: Three distance measurements can be made in the dual display format by pressing "Left" / "Right".
5. After the third distance measurement is completed, the system displays the prostate volume in the results window.

### **PSAD and PPSA Measurement**

"PSAD" and "PPSA" measurements can be made after Prostate Volume

measurement. The definition of PSAD and PPSA is as follows.

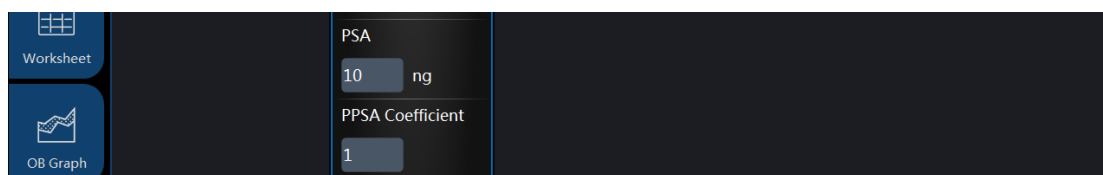
PSAD: Prostatic Specific Antigen (PSA) Density – defined as:  $PSAD = PSA/Volume$

PPSA: Predicted Prostate Specific Antigen – defined as:

$PPSA = Volume \times PPSA \text{ Coefficient}$

To measure PSAD and PPSA, the steps are as follows:

1. Press “Measure”.
2. Measure “Prostate Volume”.
3. Select “PSA” and “PPSA Coefficient”, edit the coefficients:



4. Enter the value of “PSA” and “PPSA Coefficient” in the above coefficient window.

Note: The value of “PSA” and “PPSA Coefficient” can be entered at the urology patient screen also.

5. PSAD and PPSA are automatically calculated, and the system displays the value in the results window.

## Pelvic Floor Dysfunction Measurement

### BNR (Bladder Neck Rest) Measurement

To take the Bladder Neck Rest Measurement, the steps are as follows:

1. Acquire the bladder image when the patient is in the rest status and press “Freeze”.
2. Press “Measure”.
3. Select “BNR”, and a horizontal baseline displays on the image screen
4. Move the trackball to adjust the position of the baseline at the trailing edge of the symphysis pubis, and press “Enter”.

Note: It shows positive values below the baseline and negative values above the baseline.

5. When the baseline is fixed, an active tracing caliper displays on the image screen. Move the trackball to position the caliper at the leading edge of the bladder neck.
6. Perform a standard distance measurement, and the system displays the value in the results window.

### BNS (Bladder Neck Stress) Measurement

To take the Bladder Neck Stress Measurement, the steps are as follows:

1. Acquire the bladder image after the patient finishes the “Valsalva” and press “Freeze”.
2. Press “Measure”.

- 
3. Select “BNS”, and a horizontal baseline displays on the image screen
  4. Move the trackball to adjust the position of the baseline at the trailing edge of the symphysisosslum pubis, and press “Enter”.  
Note: It shows positive values below the baseline and negative values above the baseline.
  5. When the baseline is fixed, an active tracing caliper displays. Move the trackball to put the caliper at the leading edge of the bladder neck.
  6. Perform standard distance measurement, and the system displays the value in the results window.

### **BND (Bladder Neck Down) Measurement**

To take the Bladder Neck Down Measurement. The steps are as follows:

1. Measure “BNR” and “BNS”.
2. Select “BND”, and the system displays the BND value in the results window.

Note:  $BND = BNR - BNS$

### **DWT (Detrusor Wall Thickness) Measurement**

To measure Detrusor Wall Thickness, make three distance measurements on the wall of the bladder. The steps are as follows:

1. Press “Measure”.
2. Select “DWT”, and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the distance value in the results window.
4. Repeat Step 3 to make the second and third distance measurement.
5. After the third distance measurement is completed, the system displays the average detrusor wall thickness in the results window.

### **RUV (Residual Urine) Measurement**

To calculate Residual Urine, make two distance measurements. The steps are as follows:

1. Press “Measure”.
2. Select “RUV”, and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the distance value in the results window.
4. Repeat Step 3 to make the second distance measurement.
5. When the second distance measurement is completed, the system calculates the residual urine automatically and displays the value in the Results Window.

Note:  $RUV(ml) = D1(cm) \times D2(cm) \times 5.9 - 14.9$ .

### **UTDMAX (Maximum Uterine Down Position) Measurement**

To measure the maximum position of uterine down. The steps are as follows:

1. Acquire the uterine image when the patient is on the stress status and click the Freeze button.

- 
2. Press "Measure".
  3. Select "UTDMAX", and a horizontal baseline displays on the image screen
  4. Move the trackball to adjust the position of the baseline at the trailing edge of the symphysisosslum pubis, and press "Enter".
- Note: Positive values are shown below the baseline and negative values above the baseline.
5. When the baseline is fixed, an active tracing caliper displays. Move the trackball to put the caliper at the bottom position of the uterus.
  6. Perform a standard distance measurement, and the system displays the value in the results window.

### **RADMAX (Maximum Ampulla Recti Down Position) Measurement**

To measure the maximum position of ampulla recti down, the steps are as follows:

1. Acquire the image of ampulla recti when the patient is in the stress status and press "Freeze".
  2. Press "Measure".
  3. Select "RADMAX", and a horizontal baseline displays on the image screen.
  4. Move the trackball to adjust the position of the baseline at the trailing edge of the symphysisosslum pubis, and press "Enter".
- Note: Positive values are shown below the baseline and negative values above the baseline.
5. When the baseline is fixed, an active tracing caliper displays. Move the trackball to position the caliper at the bottom of the ampulla recti.
  6. Perform a standard distance measurement, and the system displays the value in the results window.

### **Rectocele Depth and Width Measurement**

To measure Rectocele Depth and Width, make two distance measurements. The steps are as follows:

1. Press "Measure".
2. Select "Rectocele", and an active tracing caliper displays on the image screen
3. Perform one standard distance measurement, and the system displays the rectocele depth in the results window.
4. Perform another standard distance measurement, and the system displays the rectocele width in the results window.

### **Levator Hiatus Stress Measurement**

To measure Lavator Hiatus Stress, make two distance measurements and the system calculates the area automatically. The steps are as follows

1. Press "Measure".
2. Select "Levator Hiatus Stress", and an active tracing caliper displays on the image screen
3. Perform the first standard distance measurement.

- 
4. Perform the second standard distance measurement.
  5. Calculate the area of levator hiatus automatically, and the system displays the values in the results window.

The measurement menu of Urology application can be configured by adding or removing the measurement items in “B” mode. Refer to the “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.

### 10.6.2 PW Mode measurements

The “PW” mode of Gynecology application includes the following measurement folder:

- General Measurement Folder

#### General Measurement Folder

The General Measurement Folder includes the following measurement items:

- Velocity
- PS
- ED
- MD
- TAMAX
- PI
- RI
- PS/ED
- ED/PS
- FLOW VOL

The measurement menu of Urology application can be configured by adding or removing the measurement items in “PW” mode. Refer to “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.

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## 10.7 Pediatric Measurements

### Introduction

Pediatric measurements provide several types of measurement items:

- Neonatal Head
- Neonatal Abdomen
- Pediatric Abdomen
- Pediatric Hip
- FAST

### 10.7.1 2D Mode measurements

Pediatric measurements include general measurement items and some typical measurement items, such as  $HIP(\alpha)$ ,  $HIP(\alpha\beta)$ , and acetabular cartilage thickness. General measurements of 2D mode mainly consist of the following measurement items. Refer to the chapter “General Measurements” for more detailed information.

- Distance
- Area
- Volume
- Angle
- Stenosis
- A/B Ratio

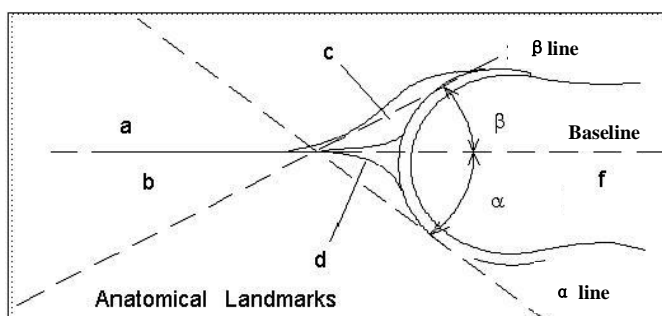
The typical measurement items of Pediatric application are as follows:

#### **Pediatric Hip Dysplasia Measurement**

It is helpful to evaluate children’s hip dysplasia by calculating the  $HIP(\alpha)$  and  $HIP(\alpha\beta)$ . To calculate  $HIP(\alpha)$  and  $HIP(\alpha\beta)$ , three lines are defined as follows:

1. Baseline, a line connected acetabular convexity and the cross point among the joint capsule, perichondrium and ilium.
2. Acetabular roof line ( $Line\alpha$ ), a line connected acetabular convexity and inferior to hip.
3. Inclination line ( $Line\beta$ ), a line connected acetabular convexity and acetabular labrum.

Angle  $\alpha$  is the angle between baseline and line  $\alpha$ , and angle  $\beta$  is the angle between baseline and line  $\beta$ .



a /b: Ilium  
 c: Acetabular labrum  
 d: Many strands of top  
 e: Acetabular roof  
 f: Caput Femoris

### HIP( $\alpha$ )

To measure HIP( $\alpha$ ). The steps are as follows:

1. Press "Measure".
2. Select "HIP( $\alpha$ )(L)" or "HIP( $\alpha$ )(R)", and a horizontal line displays on the image screen.
3. Adjust the baseline to align with the acetabular convexity using the trackball.
4. Adjust the inclination of the baseline by the "Rotation/Steer" key.
5. Fix the baseline with the Enter key, and the system displays the line.
6. Adjust the inclination of the line $\alpha$  by the "Rotation/Steer" key.
7. Fix the line $\alpha$  with the "Enter" key, and the system displays the angle $\alpha$  in the results window.

### HIP( $\alpha\beta$ )

To measure HIP( $\alpha\beta$ ). The steps are as follows:

1. Press "Measure".
2. Select "HIP( $\alpha\beta$ )(L)" or "HIP( $\alpha\beta$ )(R)", and a horizontal line displays on the image screen
3. Adjust the baseline to align with the acetabular convexity by the trackball.
4. Adjust the inclination of the baseline by the "Rotation/Steer" key.
5. Fix the baseline with the "Enter" key, and the system displays the line $\alpha$ .
6. Adjust the inclination of the line $\alpha$  by the "Rotation/Steer" key.
7. Fix the line $\alpha$  with the "Enter" key, and the system displays the line $\beta$ .
8. Adjust the inclination of the line $\beta$  by the "Rotation/Steer" key.
9. Fix the line $\beta$  with the "Enter" key, and the system displays the angle $\alpha$  and angle $\beta$  in the results window.

### Measurement configuration of HIP( $\alpha\beta$ )

The steps are as follows:

1. Select the configuration menu of "HIP( $\alpha\beta$ )" measurement, and the system shows its measurement method as shown below:
2. Select the measurement method "Group" or "Ungroup" to complete the measurement setting.

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Note: Baseline, line $\alpha$  and line $\beta$  always intersect at the acetabular convexity. Therefore, the operator should keep the three lines intersect at one point when using either the Group method or Ungroup method.

### **Pediatric Hip Dysplasia Classification on the HIP( $\alpha\beta$ ) measurements**

The steps are as follows:

1. Select “Hip Growth Type Definition” after the “HIP( $\alpha\beta$ )” measurements, and the system shows the pediatric hip dysplasia classification as shown below:
2. The pediatric hip dysplasia type can be rated based on the result of the HIP( $\alpha\beta$ ) measurements.

### **Acetabular Cartilage Thickness**

To measure Acetabular Cartilage Thickness, make a single distance measurement.

The steps are as follows:

1. Press “Measure”.
2. Select “ACT”, and an active tracing caliper displays on the image screen
3. Perform one standard distance measurement, and the system displays the acetabular cartilage thickness in the results window.

### **Vaim (Ped Hip)**

“Vaim” means intelligent measurement. The feature only can be used under these items: OB, Pelvic, Uterus, Follicle and Ped Hip.

To execute the Vaim measurements, the steps are as follows:

1. Choose the Ped Hip application.
2. Touch “Vaim” press.
3. The results can be calculated automatically and shown in the screen.

## **10.7.2 PW mode measurements**

The “PW” mode of Pediatric application includes the following measurement folder:

- General Measurement Folder
- Anterior cerebral artery measurement folder
- Middle cerebral artery measurement folder
- Posterior cerebral artery measurement folder

Configure the measurement menu of Pediatric application by adding or removing the measurement folders in “PW” mode. Refer to the “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.



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### General Measurement Folder

In the General Measurement Folder, it includes measurement items as follows:

- Velocity
- PS
- ED
- MD
- TAMAX
- PI
- RI
- PS/ED
- ED/PS
- Flow VOL

The measurement menu of Urology application can be configured by adding or removing the measurement items in “PW” mode. Refer to “Measurement Menu Configuration” in the chapter “General Measurements” for how to make the configuration of the measurement menu.

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## 10.8 Obstetrics Measurements

### Examination Preparation:

Prior to an ultrasound examination, the patient should be informed of the clinical indication, specific benefits, potential risks, and alternatives, if any. In addition, if the patient requests information about the exposure time and intensity, it should be provided. Patient access to educational materials regarding ultrasound is strongly encouraged to supplement the information communicated directly to the patient. Furthermore, these examinations should be conducted in a manner and take place in a setting which assures patient dignity and privacy.

- Prior material knowledge and approval of the presence of nonessential personnel with the number of such personnel kept to a minimum.
- An intent to share the information obtained with the parents per the physician's judgment, either during the examination or shortly thereafter.
- An offer of choice about viewing the fetus.
- An offer of choice about learning the sex of the fetus, if such information becomes available. However, an ultrasound examination should not be carried out for the sole purpose of identifying the sex of the fetus.
- Ultrasound examination performed solely to satisfy the family's desire to know the sex of the fetus, to view the fetus, or to obtain a picture of the fetus should be discouraged.

### Acoustic Output Considerations

#### General warning

This device is a multi-use device which is capable of exceeding FDA pre-enactment acoustic output (spatial peak temporal average) intensity limits for fetal applications.

#### CAUTION

It is prudent to conduct an examination with the minimum amount and duration of acoustic output necessary to optimize the image's diagnostic value.

#### Concerns surrounding fetal exposure

Always be aware of the acoustic output level by observing the Acoustic Output Display. In addition, become thoroughly familiar with the Acoustic Output Display and equipment controls affecting output.

#### Training

It is recommended that all operators receive proper training in fetal Doppler applications before performing them in a clinical setting. Contact a local sales representative for training assistance please.

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## Introduction

Obstetrics measurements provide several types of measurement items:

- OB Early
- OB Mid
- OB Late
- Fetal Heart

### 10.8.1 2D Mode measurements

Obstetrics measurements include general measurement items and some typical measurement items, such as GS, CRL, NT, OB Ratio, Estimated Fetal Weight, OB Curve and OB Table. General measurements of 2D mode mainly consist of the measurement items below. Refer to the chapter “General Measurements” for more detailed information.

- Depth
- Distance
- A/B Ratio

The typical measurement items of Obstetrics application are as shown below:

#### **Gestational Sac (GS)**

To measure the size of gestational sac, the method of measurement can be configured:

1. Press “Measure”.
2. Select “GS” with the measurement method “Max”, and an active tracing caliper displays.
3. Perform a standard distance measurement, and the system displays the maximum diameter of the gestational sac in the results window.

To calculate the size of gestational sac with the “Mean” measurement method, make three distance measurements. The steps are as follows:

1. Press “Measure”.
2. Select “GS” with the measurement method “Mean”, and an active tracing caliper displays on the image screen.
3. Perform a standard distance measurement. The system displays the distance value in the results window.
4. Repeat Step 3 to make the second and third distance measurement.

Note: Three distance measurements can be made in the dual display format by pressing “Left” / “Right”.

5. After the third distance measurement is completed, the system displays the average diameter of the gestational sac in the results window.

#### **Yolk Sac (YS)**

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To measure the size of Yolk Sac, the steps are as follows:

1. Press “Measure”.
2. Select “YS”, and an active tracing caliper displays on the image screen.
3. Perform a standard distance measurement. The system displays the size of yolk sac in the results window.

### **Crown-rump Length (CRL)**

To measure the Crown-rump Length, the steps are as follows:

1. Press “Measure”.
2. Select “CRL”, and an active tracing caliper displays on the image screen.
3. Perform a standard distance measurement. The system displays the crown-rump length in the results window.

### **Nuchal Translucency Thickness**

To measure the Nuchal Translucency Thickness, if select the method “Manual”, the steps are as follows:

1. Press “Measure”.
2. Select “NT”, and an active tracing caliper displays on the image screen.
3. Perform a standard distance measurement. The system displays the nuchal translucency thickness in the results window.

If select the method “Auto”, the steps are as follows:

1. Press “Measure”.
2. Select “NT”, and an active tracing caliper displays on the image screen.
4. Fix one dotted box in the interest area, the system will provide the measurement value automatically.

### **Intracranial Translucency Thickness**

To measure the Intracranial Translucency Thickness, if select the method “Manual”, the steps are as follows:

1. Press “Measure”.
2. Select “IT”, and an active tracing caliper displays on the image screen.
3. Perform a standard distance measurement. The system displays the Intracranial translucency thickness in the results window.

If select the method “Auto”, the steps are as follows:

1. Press “Measure”.
2. Select “IT”, and an active tracing caliper displays on the image screen.
4. Fix one dotted box in the interest area, the system will provide the measurement value automatically.

### **Uterus Volume (UT)**

To calculate Uterus Volume, make three distance measurements. The steps are as follows:

- 
1. Press "Measure".
  2. Select "UT", and an active tracing caliper displays on the image screen.
  3. Perform a standard distance measurement. The system displays the distance value in the results window.
  4. Repeat Step 3 to make the second and third distance measurement.
- Note: Three distance measurements can be made in the dual display format by pressing "Left" / "Right".
5. After the third distance measurement is completed, the system displays the uterus volume in the results window.

### **Endometriosis Thickness (En.)**

To measure Endometriosis Thickness, the steps are as follows:

1. Press "Measure".
2. Select "En.", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the endometriosis thickness in the results window.

### **Ovary Volume (OV)**

To calculate Ovary Volume, make three distance measurements normally. The steps are as follows:

1. Press "Measure".
  2. Select "OV (L)" or "OV(R)", and an active tracing caliper displays on the image screen
  3. Perform a standard distance measurement. The system displays the distance value in the results window.
  4. Repeat Step 3 to make the second and third distance measurement.
- Note: Three distance measurements can be made in the dual display format by pressing "Left" / "Right".
5. After the third distance measurement is completed, the system displays the ovary volume in the results window.

### **Biparietal Diameter (BPD)**

There are 2 methods: Manual and Auto.

To measure Biparietal Diameter with "Manual", the steps are as follows:

1. Press "Measure".
2. Select "BPD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the biparietal diameter in the results window.

To measure Biparietal Diameter with "Auto", the steps are as follows:

1. Press "Measure".
2. Select "BPD" in "Config" page, touch "Auto".
3. Save and exit.
4. Move the cursor to the image, press "Enter" key.

---

5. The system will get the result of BPD automatically.

### **Occipito-frontal Diameter (OFD)**

There are 2 methods: Manual and Auto.

To measure Occipito-frontal Diameter, the steps are as follows:

1. Press "Measure".
2. Select "OFD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the occipito-frontal diameter in the results window.

To measure **Occipito-frontal Diameter** with "Auto", the steps are as follows:

1. Press "Measure".
2. Select "OFD" in "Config" page, touch "Auto".
3. Save and exit.
4. Move the cursor to the image, press "Enter" key.
5. The system will get the result of BPD automatically.

### **Head Circumference (HC)**

To calculate Head Circumference, there are six measurement methods:

BPD&OFD, Ellipse, Polygon, Spine and Trace. Ellipse and BPD&OFD method are the most common settings.

To measure Head Circumference with the "BPD&OFD" method, make two distance measurements. The steps are as follows:

1. Press "Measure".
2. Select "HC".
3. Select the measurement method "BPD&OFD" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second distance measurement.
6. After the second distance measurement is completed, the system displays the head circumference in the results window.

To measure Head Circumference with the "Ellipse" method, make an ellipse measurement. The steps are as follows:

1. Press "Measure".
2. Select "HC".
3. Select the measurement method "Ellipse" as the default setting from the configuration menu, and an active ellipse displays on the image screen
4. To position the active caliper of the ellipse, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.

- 
7. Adjust the "Ellipse" control and an ellipse with an initial circle shape displays.  
Note: To position the ellipse and to size the measured axes (move the calipers), move trackball.
  8. To complete the measurement, press "Enter". The system displays the head circumference in the results window.

To measure Head Circumference with the "Polygon" method, make a polygon trace measurement. The steps are as follows:

1. Press "Measure".
  2. Select "HC".
  3. Select the measurement method "Polygon" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
  4. To position the active caliper of the polygon, move the trackball.
  5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
  6. To position the second caliper, move the trackball.
  7. To fix the second point, press "Enter". The system fixes the second caliper and displays a third active caliper.
  8. To position the third caliper, move the trackball.
  9. To fix the third point, press "Enter". The system fixes the third caliper and displays a next active caliper.
- Note: At least three calipers are needed to form a polygon.
10. Repeat Steps 8-9 to add more caliper of the polygon.
  11. To complete the measurement, press "Enter". The system displays the head circumference in the results window.

Note:

Before completing the polygon measurement,

- To erase the line (little by little) back from its current point, press "Clear" once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

To measure Head Circumference with the "Spline" method, make a spline trace measurement. The steps are as follows:

1. Press "Measure".
2. Select "HC".
3. Select the measurement method "Spline" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. To position the active caliper of the spline, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. To fix the second point, press "Enter". The system fixes the second caliper and displays a third active caliper.

- 
8. To position the third caliper, move the trackball.
  9. To fix the third point, press "Enter". The system fixes the third caliper and displays a next active caliper.
- Note: At least three calipers are needed to form a spline.
10. Repeat Steps 8-9 to add more calipers to the spline.
  11. To complete the measurement, press "Enter". The system displays the head circumference in the results window.

Note:

Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press "Clear" once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

To measure Head Circumference with the "Trace" method, the steps are as follows:

1. Press "Measure".
2. Select "HC".
3. Select the measurement method "Trace" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. To position the trace caliper, move the trackball.
5. To fix the trace start point, press "Enter". The system fixes the first caliper and the trace caliper changes to an active tracing caliper.
6. To trace the measurement area, move the trackball around the anatomy.
7. To complete the measurement, press "Enter". The system displays the head circumference in the results window.

Note:

Before completing the spline measurement,

- To erase the line (Before completing little by little) back from its current point, press "Clear" k once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

Measure "HC" with "Auto" method:

1. Press "Measure".
2. Select "HC" in "Config" page, touch "Auto".
3. Save and exit.
4. Move the cursor to the image, press "Enter" key.
5. The system will get the result of "HC" automatically.

### **Cerebellar Diameter (CD)**

To measure Cerebellar Diameter, the steps are as follows:

1. Press "Measure".
2. Select "CD", and an active tracing caliper displays on the image screen



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3. Perform a standard distance measurement. The system displays the cerebellar diameter in the results window.

### **Transverse Cerebellar Diameter (TCD)**

To measure Transverse Cerebellar Diameter, the steps are as follows:

1. Press "Measure".
2. Select "TCD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the transverse cerebellar diameter in the results window.

### **Binocular Diameter (BD)**

To measure Binocular Diameter, the steps are as follows:

1. Press "Measure".
2. Select "BD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the binocular diameter in the results window.

### **Outer Orbital Diameter (OOD)**

To measure Outer Orbital Diameter, the steps are as follows:

1. Press "Measure".
2. Select "OOD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the outer orbital diameter in the results window.

### **Inter Orbital Diameter (IOD)**

To measure Inter Orbital Diameter, the steps are as follows:

1. Press "Measure".
2. Select "IOD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the inter-orbital diameter in the results window.

### **Humerus Length (HL)**

To measure Humerus Length, the steps are as follows:

1. Press "Measure".
2. Select "HL", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the humerus length in the results window.

### **Anter-posterior Abdominal Diameter (APAD)**

To measure Anter-posterior Abdominal Diameter, the steps are as follows:

1. Press "Measure".
2. Select "APAD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the anter-posterior abdominal diameter in the results window.

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### **Transverse Abdominal Diameter (TAD)**

To measure Transverse Abdominal Diameter, the steps are as follows:

1. Press "Measure".
2. Select "TAD", and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the transverse abdominal diameter in the results window.

### **Abdominal Circumference (AC)**

To calculate Abdominal Circumference, there are six measurement methods: APAD&TAD, Ellipse, Polygon, Spine and Trace. Ellipse and APAD&TAD method are the default settings.

To measure Abdominal Circumference with the "APAD&TAD" method, make two distance measurements. The steps are as follows:

1. Press "Measure".
2. Select "AC".
3. Select the measurement method "APAD&TAD" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second distance measurement.
6. After the second distance measurement is completed, the system displays the abdominal circumference in the results window.

To measure Abdominal Circumference with the "Ellipse" method, make an ellipse measurement. The steps are as follows:

1. Press "Measure".
2. Select "AC".
3. Select the measurement method "Ellipse" as the default setting from the configuration menu, and an active ellipse displays on the image screen
4. To position the active caliper of the ellipse, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. Adjust the "Ellipse" control and an ellipse with an initial circle shape displays.  
Note: To position the ellipse and to size the measured axes (move the calipers), move the trackball.
8. To complete the measurement, press "Enter". The system displays the abdominal circumference in the results window.

To measure Abdominal Circumference with the "Polygon" method, make a polygon trace measurement. The steps are as follows:

1. Press "Measure".

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2. Select "AC".
  3. Select the measurement method "Polygon" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
  4. To position the active caliper of the polygon, move the trackball.
  5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
  6. To position the second caliper, move the trackball.
  7. To fix the second point, press "Enter". The system fixes the second caliper and displays a third active caliper.
  8. To position the third caliper, move the trackball.
  9. To fix the third point, press "Enter". The system fixes the third caliper and displays a next active caliper.
- Note: At least three calipers are needed to form a polygon.
10. Repeat Steps 8-9 to add more calipers to the polygon.
  11. To complete the measurement, press "Enter". The system displays the abdominal circumference in the results window.

Note:

Before completing the polygon measurement,

- To erase the line (little by little) back from its current point, press "Clear" once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

To measure Abdominal Circumference with the "Spline" method, make a spline trace measurement. The steps are as follows:

1. Press "Measure".
2. Select "AC".
3. Select the measurement method "Spline" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. To position the active caliper of the spline, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. To fix the second point, press "Enter". The system fixes the second caliper and displays a third active caliper.
8. To position the third caliper, move the trackball.
9. To fix the third point, press "Enter". The system fixes the third caliper and displays a next active caliper.

Note: At least three calipers are needed to form a spline.

10. Repeat Steps 8-9 to add more caliper of the spline.
11. To complete the measurement, press "Enter". The system displays the abdominal circumference in the results window.

Note:

Before completing the spline measurement,

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- To erase the line (little by little) back from its current point, press “Clear” key once;
  - To clear the trace caliper and the current data measured, press “Clear” for at least 2 seconds.

To measure Abdominal Circumference with the “Trace” method, the steps are as follows:

1. Press “Measure”.
2. Select “AC”.
3. Select the measurement method “Trace” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. To position the trace caliper, move the trackball.
5. To fix the trace start point, press “Enter”. The system fixes the first caliper and the trace caliper changes to an active tracing caliper.
6. To trace the measurement area, move the trackball around the anatomy.
7. To complete the measurement, press “Enter”. The system displays the abdominal circumference in the results window.

Note: Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press “Clear” key once;
- To clear the trace caliper and the current data measured, press “Clear” for at least 2 seconds.

Measure “AC” with “Auto” method:

1. Press “Measure”.
2. Select “AC” in “Config” page, touch “Auto”.
3. Save and exit.
4. Move the cursor to the image, press “Enter” key.
5. The system will get the result of “AC” automatically.

### **Anter-posterior Trunk Diameter (APTD)**

To measure Anter-posterior Trunk Diameter, the steps are as follows:

1. Press “Measure”.
2. Select APTD, and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the anter-posterior trunk diameter in the results window.

### **Transverse Trunk Diameter (TTD)**

To measure Transverse Trunk Diameter:

1. Press “Measure”.
2. Select “TTD”, and an active tracing caliper displays on the image screen
3. Perform a standard distance measurement. The system displays the transverse trunk diameter in the results window.

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### Trunk Cross-sectional Area (AxT)

To calculate Trunk Cross-sectional Area, there are five measurement methods: APAD&TAD, Ellipse, Polygon, Spine and Trace. Ellipse and APTD&TTD method are the most common settings.

To measure Trunk Cross-sectional Area with the “APTD&TTD” method, make two distance measurements.

1. Press “Measure”.
2. Select “AxT”.
3. Select the measurement method “APTD&TTD” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second distance measurement.
6. After the second distance measurement is completed, the system displays the trunk cross-sectional area in the results window.

To measure Trunk Cross-sectional Area with the Ellipse method, make an ellipse measurement. The steps are as follows:

1. Press “Measure”.
2. Select “AxT”.
3. Select the measurement method “Ellipse” as the default setting from the configuration menu, and an active ellipse displays on the image screen
4. To position the active caliper of the ellipse, move the trackball.
5. To fix the start point, press “Enter”. The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. Adjust the “Ellipse” control and an ellipse with an initial circle shape displays.

Note:

To position the ellipse and to size the measured axes (move the calipers), move the trackball.

8. To complete the measurement, press “Enter”. The system displays the trunk cross-sectional area in the results window.

To measure Trunk Cross-sectional Area with the “Polygon” method, make a polygon trace measurement. The steps are as follows:

1. Press “Measure”.
2. Select “AxT”.
3. Select the measurement method “Polygon” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. To position the active caliper of the polygon, move the trackball.
5. To fix the start point, press “Enter”. The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.

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7. To fix the second point, press “Enter”. The system fixes the second caliper and displays a third active caliper.

8. To position the third caliper, move the trackball.

9. To fix the third point, press “Enter”. The system fixes the third caliper and displays a next active caliper.

Note: At least three calipers are needed to form a polygon.

10. Repeat Steps 8-9 to add more calipers to the polygon.

11. To complete the measurement, press “Enter”. The system displays the trunk cross-sectional area in the results window.

Note:

Before completing the polygon measurement,

- To erase the line (little by little) back from its current point, press “Clear” key once;
- To clear the trace caliper and the current data measured, press “Clear” for at least 2 seconds.

To measure Trunk Cross-sectional Area with the “Spline” method, make a spline trace measurement. The steps are as follows:

1. Press “Measure”.

2. Select “AxT”.

3. Select the measurement method “Spline” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen

4. To position the active caliper of the spline, move the trackball.

5. To fix the start point, press “Enter”. The system fixes the first caliper and displays a second active caliper.

6. To position the second caliper, move the trackball.

7. To fix the second point, press “Enter”. The system fixes the second caliper and displays a third active caliper.

8. To position the third caliper, move the trackball.

9. To fix the third point, press “Enter”. The system fixes the third caliper and displays a next active caliper.

Note: At least three calipers are needed to form a spline.

10. Repeat Steps 8-9 to add more caliper of the spline.

11. To complete the measurement, press “Enter”. The system displays the trunk cross-sectional area in the results window.

Note:

Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press “Clear” once;
- To clear the trace caliper and the current data measured, press “Clear” for at least 2 seconds.

To measure Trunk Cross-sectional Area with the “Trace” method, the steps are as follows:

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1. Press "Measure".
  2. Select "AxT".
  3. Select the measurement method Trace as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
  4. To position the trace caliper, move the trackball.
  5. To fix the trace start point, press "Enter". The system fixes the first caliper and the trace caliper changes to an active tracing caliper.
  6. To trace the measurement area, move the trackball around the anatomy.
  7. To complete the measurement, press "Enter". The system displays the trunk cross-sectional area in the results window.

Note:

Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press "Clear" key once.
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

### **Fetal Trunk Area (FTA)**

To calculate Fetal Trunk Area, there are five measurement methods: LTD&TTD, Ellipse, Polygon, Spine and Trace. Ellipse and LTD&TTD method are the most default settings.

To measure Fetal Trunk Area with the LTD&TTD method, make two distance measurements. The steps are as follows:

1. Press "Measure".
2. Select "FTA".
3. Select the measurement method "LTD&TTD" as the default setting from the configuration menu and an active tracing caliper displays on the image screen
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second distance measurement.
6. After the second distance measurement is completed, the system displays the fetal trunk area in the results window.

To measure Fetal Trunk Area with the Ellipse method, make an ellipse measurement. The steps are as follows:

1. Press "Measure".
2. Select "FTA".
3. Select the measurement method "Ellipse" as the default setting from the configuration menu, and an active ellipse displays.
4. To position the active caliper of the ellipse, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.

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7. Adjust the “Ellipse” control and an ellipse with an initial circle shape displays.

Note:

To position the ellipse and to size the measured axes (move the calipers), move the trackball.

8. To complete the measurement, press “Enter”. The system displays the fetal trunk area in the results window.

To measure Fetal Trunk Area with the “Polygon” method, make a polygon trace measurement. The steps are as follows:

1. .Press “Measure”

2. Select “FTA”.

3. Select the measurement method “Polygon” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen

4. To position the active caliper of the polygon, move the trackball.

5. To fix the start point, press “Enter”. The system fixes the first caliper and displays a second active caliper.

6. To position the second caliper, move the trackball.

7. To fix the second point, press “Enter”. The system fixes the second caliper and displays a third active caliper.

8. To position the third caliper, move the trackball.

9. To fix the third point, press “Enter”. The system fixes the third caliper and displays a next active caliper.

Note: At least three calipers are needed to form a polygon.

10. Repeat Steps 8-9 to add more caliper of the polygon.

11. To complete the measurement, press “Enter”. The system displays the fetal trunk area in the results window.

Note:

Before completing the polygon measurement,

- To erase the line (little by little) back from its current point, press “Clear” once;
- To clear the trace caliper and the current data measured, press “Clear” for at least 2 seconds.

To measure Fetal Trunk Area with the “Spline” method, make a spline trace measurement. The steps are as follows:

1. Press “Measure”.

2. Select “FTA”.

3. Select the measurement method “Spline” as the default setting from the configuration menu, and an active tracing caliper displays on the image screen

4. To position the active caliper of the spline, move the trackball.

5. To fix the start point, press “Enter”. The system fixes the first caliper and displays a second active caliper.

6. To position the second caliper, move the trackball.

7. To fix the second point, press “Enter”. The system fixes the second caliper and



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displays a third active caliper.

8. To position the third caliper, move the trackball.

9. To fix the third point, press the Enter key. The system fixes the third caliper and displays a next active caliper.

Note: At least three calipers are needed to form a spline.

10. Repeat Steps 8-9 to add more caliper of the spline.

11. To complete the measurement, press "Enter". The system displays the fetal trunk area in the results window.

Note:

Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press "Clear" key once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds.

To measure Fetal Trunk Area with the "Trace" method, the steps are as follows:

1. Press "Measure".

2. Select "FTA".

3. Select the measurement method "Trace" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen

4. To position the trace caliper, move the trackball.

5. To fix the trace start point, press "Enter". The system fixes the first caliper and the trace caliper changes to an active tracing caliper.

6. To trace the measurement area, move the trackball around the anatomy.

7. To complete the measurement, press "Enter". The system displays the fetal trunk area in the results window.

Note:

Before completing the spline measurement,

- To erase the line (little by little) back from its current point, press "Clear" key once;
- To clear the trace caliper and the current data measured, press "Clear" for at least 2 seconds

### **Transverse Thorax Diameter (THD)**

To measure Transverse Thorax Diameter, the steps are as follows:

1. Press "Measure".

2. Select "THD", and an active tracing caliper displays on the image screen

3. Perform a standard distance measurement. The system displays the transverse thorax diameter in the results window.

### **Thorax Circumference (ThC)**

To calculate Thorax Circumference, there are five measurement methods: L&W, Ellipse, Polygon, Spine and Trace. Ellipse and L&W method are the most default settings.

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To measure Thorax Circumference with the L&W method, make two distance measurements. The steps are as follows:

1. Press "Measure".
2. Select "THC".
3. Select the measurement method "L&W" as the default setting from the configuration menu, and an active tracing caliper displays on the image screen
4. Perform a standard distance measurement. The system displays the distance value in the results window.
5. Repeat Step 3 to make the second distance measurement.
6. After the second distance measurement is completed, the system displays the thorax circumference in the results window.

To measure Thorax Circumference with the Ellipse method, make an ellipse measurement. The steps are as follows:

1. Press "Measure".
2. Select "THC".
3. Select the measurement method "Ellipse" as the default setting from the configuration menu, and an active ellipse displays on the image screen
4. To position the active caliper of the ellipse, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. Adjust the "Ellipse" control and an ellipse with an initial circle shape displays.

Note:

To position the ellipse and to size the measured axes(move the calipers), move the trackball.

8. To complete the measurement, press "Enter". The system displays the thorax circumference in the results window.

To measure Thorax Circumference with the Polygon method, make a polygon trace measurement. The steps are as follows:

1. Press "Measure".
2. Select "THC".
3. Select the measurement method Polygon as the default setting from the configuration menu, and an active tracing caliper displays.
4. To position the active caliper of the polygon, move the trackball.
5. To fix the start point, press "Enter". The system fixes the first caliper and displays a second active caliper.
6. To position the second caliper, move the trackball.
7. To fix the second point, press "Enter". The system fixes the second caliper and displays a third active caliper.
8. To position the third caliper, move the trackball.
9. To fix the third point, press "Enter". The system fixes the third caliper and