OLYMPUS

Endoscopic Ultrasound Center

EU-ME3

Quick Reference Guide

NOTE: This document is for quick reference only. Please refer to the relevant User's Manuals for instructions, warnings and cautions. Nothing in this presentation is meant to supersede or replace the instructions for use applicable to each specific device, or the processes and procedures in place at your facility.

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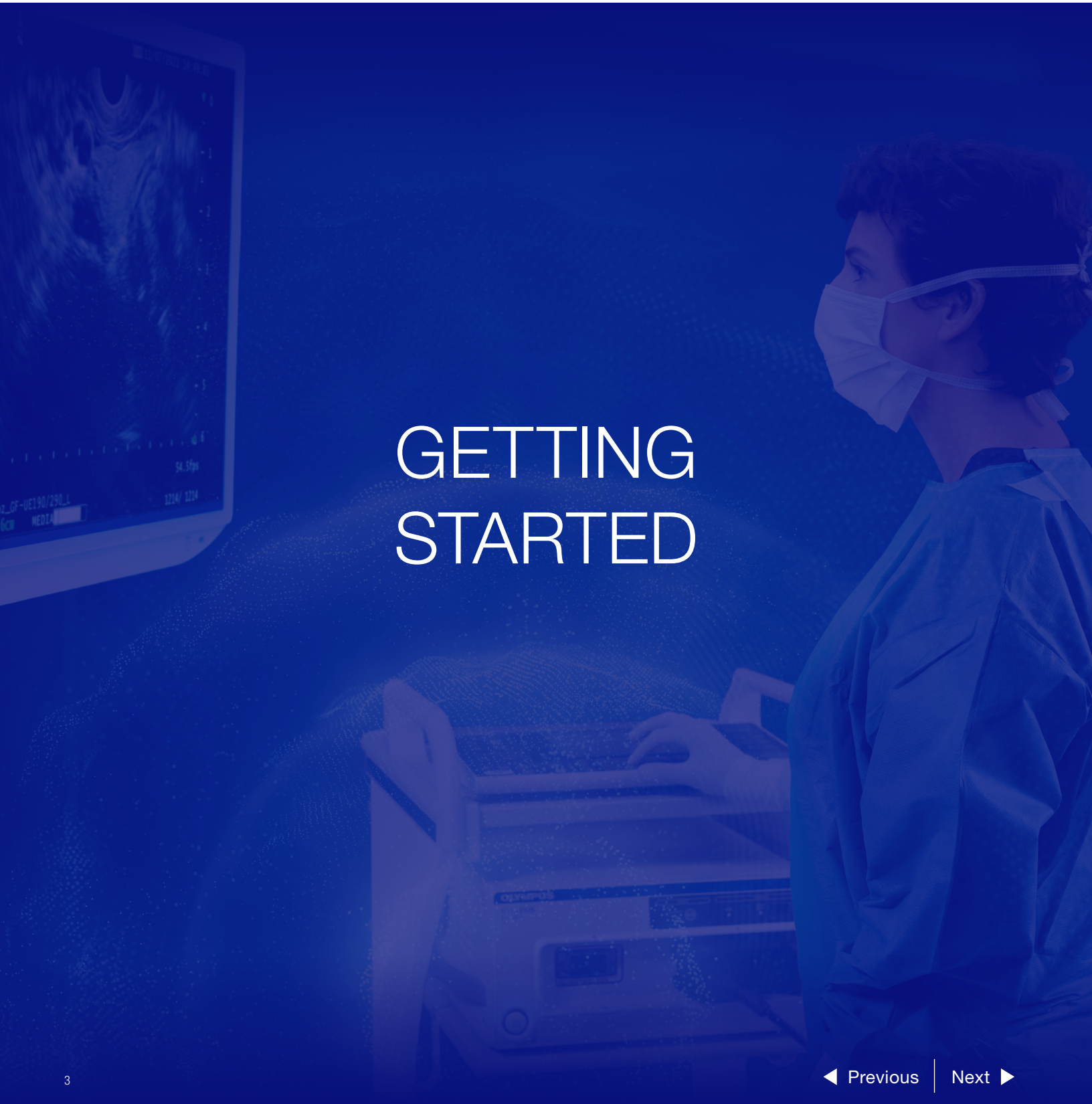


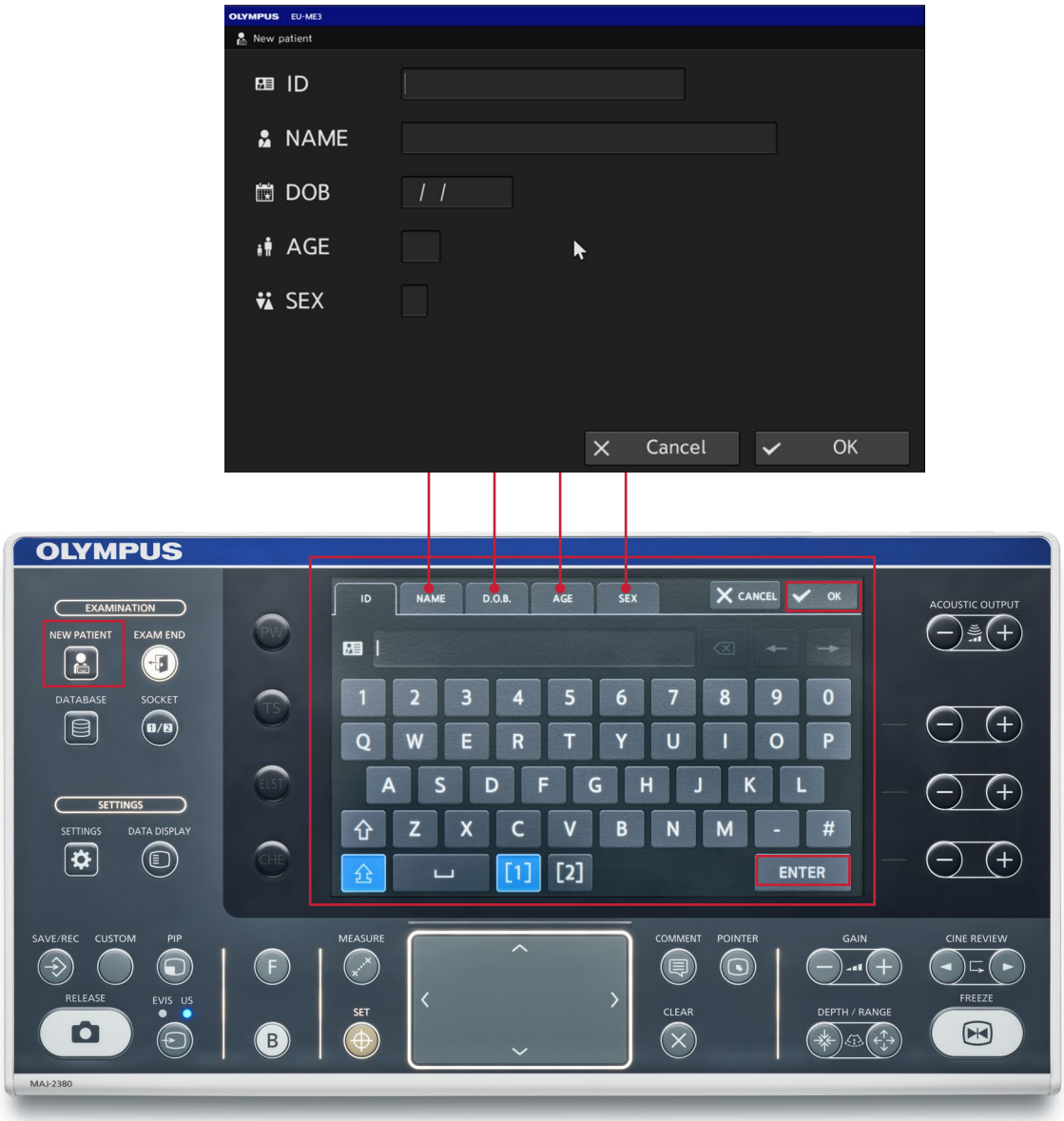
GETTING STARTED

Connecting an Ultrasound Endoscope, Cable or Probe Driving Unit

1. Ensure that the system is powered off or the **ACTIVE** lamp is off, before connecting an endoscope, cable or probe driving unit.
2. Align the scope or probe driver connector according to the picture below the socket.
   - **SOCKET 1** - Radial Probe Driver
   - **SOCKET 2** - Radial or Linear Scopes
3. Push in until the connector is seated securely.
4. Turn the lever clockwise to lock the connector in place.
5. **POWER** on the system or turn on the **ACTIVE** lamp.

CAUTION: FREEZE or deactivate the ACTIVE lamp before disconnecting any ultrasound connector (scope, probe, cable or probe driver).

Entering Patient Data



1. Press the **NEW PATIENT** button on the keyboard.
2. The New Patient screen will appear on the touch panel and monitor. Enter the patient data by switching between the tabs.
3. After all items have been entered, press the **ENTER** or **OK** button to save the information and close the patient data input screen.

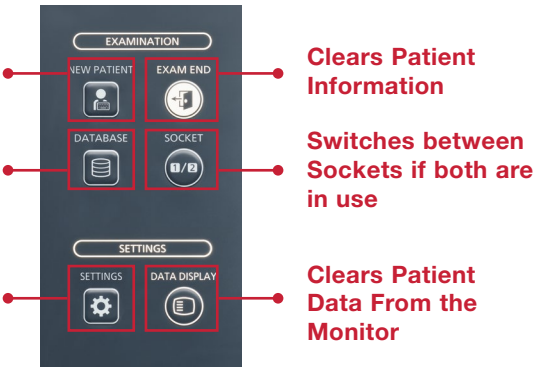
If Security Settings are turned ON, you may be required to login to the system before entering patient data and/or saving data to the hard drive.
To clear patient data, press Exam End.

Keyboard Layout and Functionality

Trackpad Operation

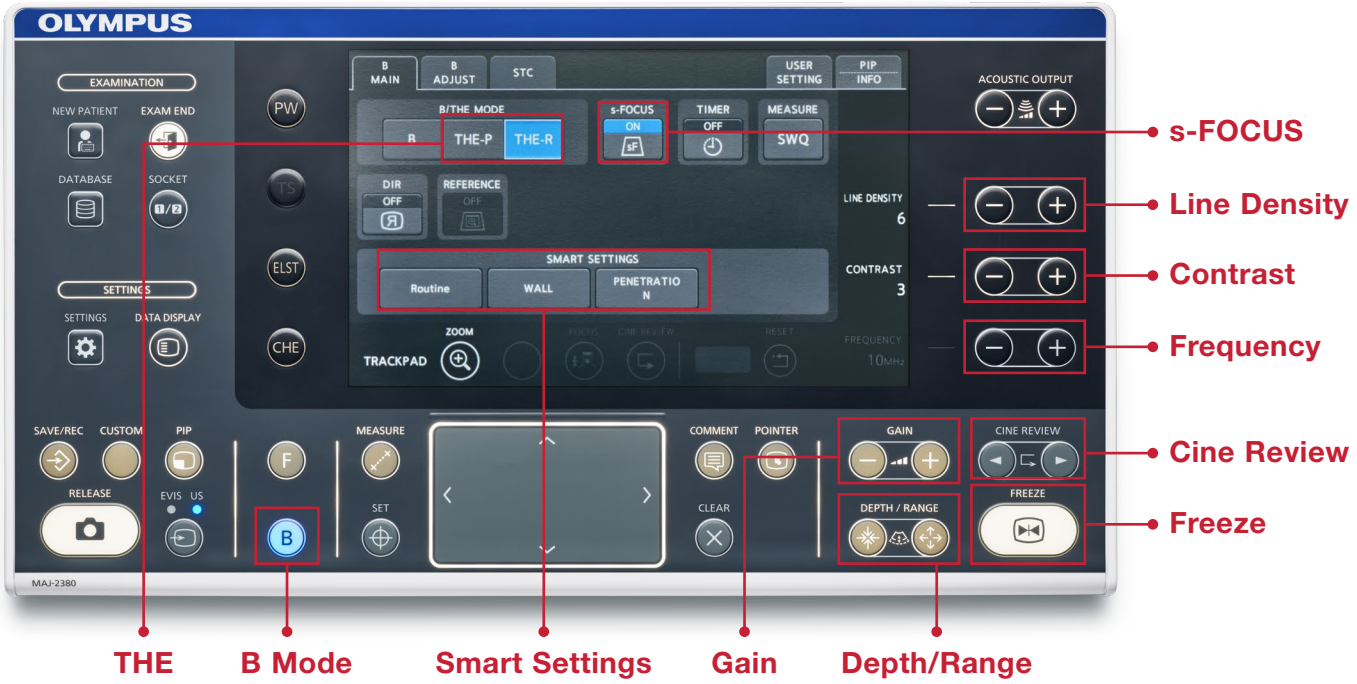
- Pinch in and out to resize.
- Drag to reposition.
- Tap to set or select.

Patient Information, Exam Options and Settings



IMAGING CONTROLS

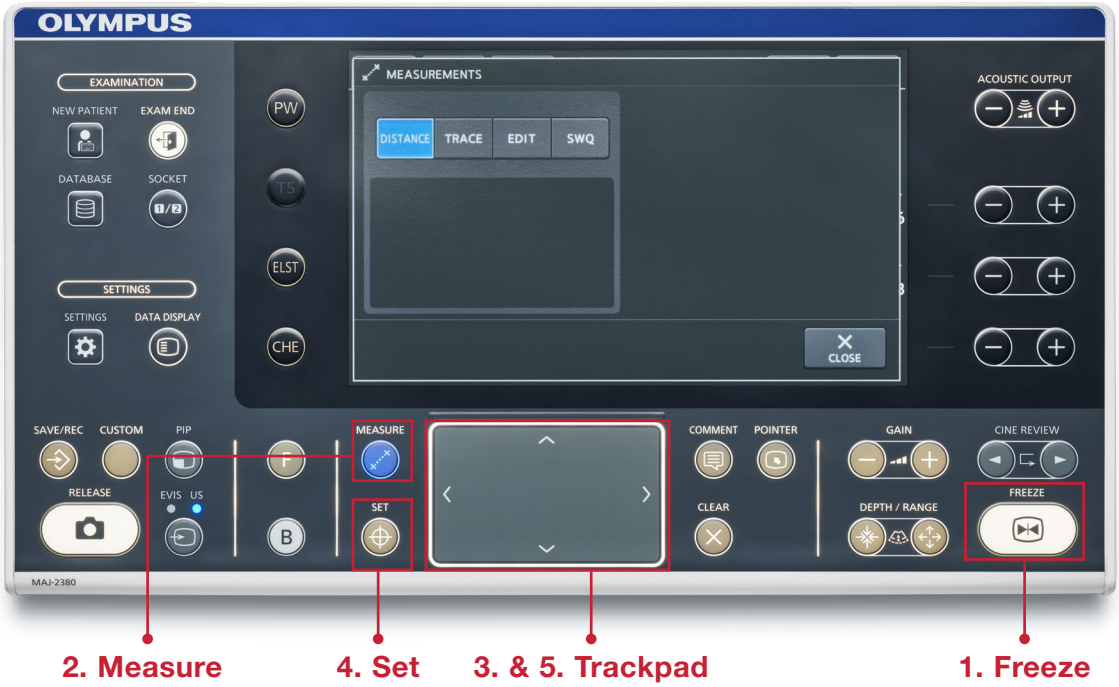
Imaging Controls



- **B MODE (Brightness Mode)** - Main scanning mode.
- **THE MODE (Tissue Harmonic Echo Mode)** - Uses higher-frequency harmonic components to build an image of the targeted area.
  - **THE-P:** Penetration priority mode.
  - **THE-R:** Resolution priority mode.
- **GAIN** - Increases or decreases the image brightness.
- **DEPTH/RANGE** - Adjusts how many centimeters of tissue are displayed on the screen.
- **FREEZE** - Freezes and unfreezes the ultrasound image.
- **CINE REVIEW** - Allows you to review prior frames.
  - Cine review can also be performed with the trackpad by swiping right and left.
- **FREQUENCY** - Increases or decreases the ultrasound transmission frequency.
  - Cannot be changed when using THE mode.
  - Use a lower frequency for penetration and a higher frequency for resolution.
- **CONTRAST** - Adjusts the levels of gray in an image.
- **LINE DENSITY** - Adds scan lines to the image when increased, potentially improving resolution, but decreases the frame rate.
- **S-FOCUS** - Performs focusing throughout the depth of field, eliminating the need to make manual adjustments of the focal zones during the procedure.
  - Cannot be used in CHE mode.
- **SMART SETTINGS** - Sub-presets, optimized to meet user needs.

MEASUREMENTS & ANNOTATIONS

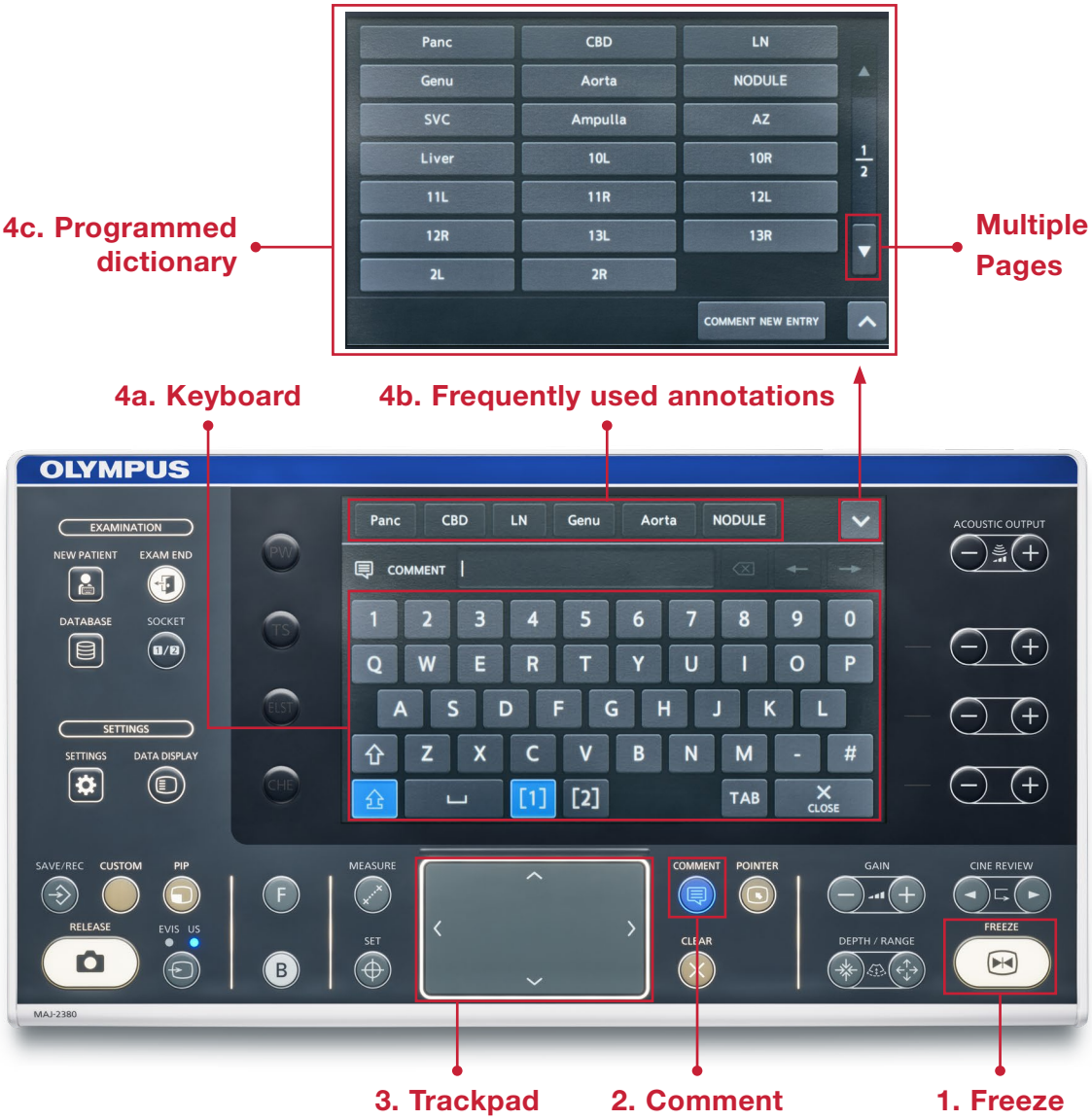
Measurement Steps



1. **FREEZE** image.
2. Press **MEASURE.**
3. Place caliper using **TRACKPAD.**
4. Press **SET.**
5. Place second caliper using **TRACKPAD.**

For a second measurement, press **SET** and repeat steps 3-5

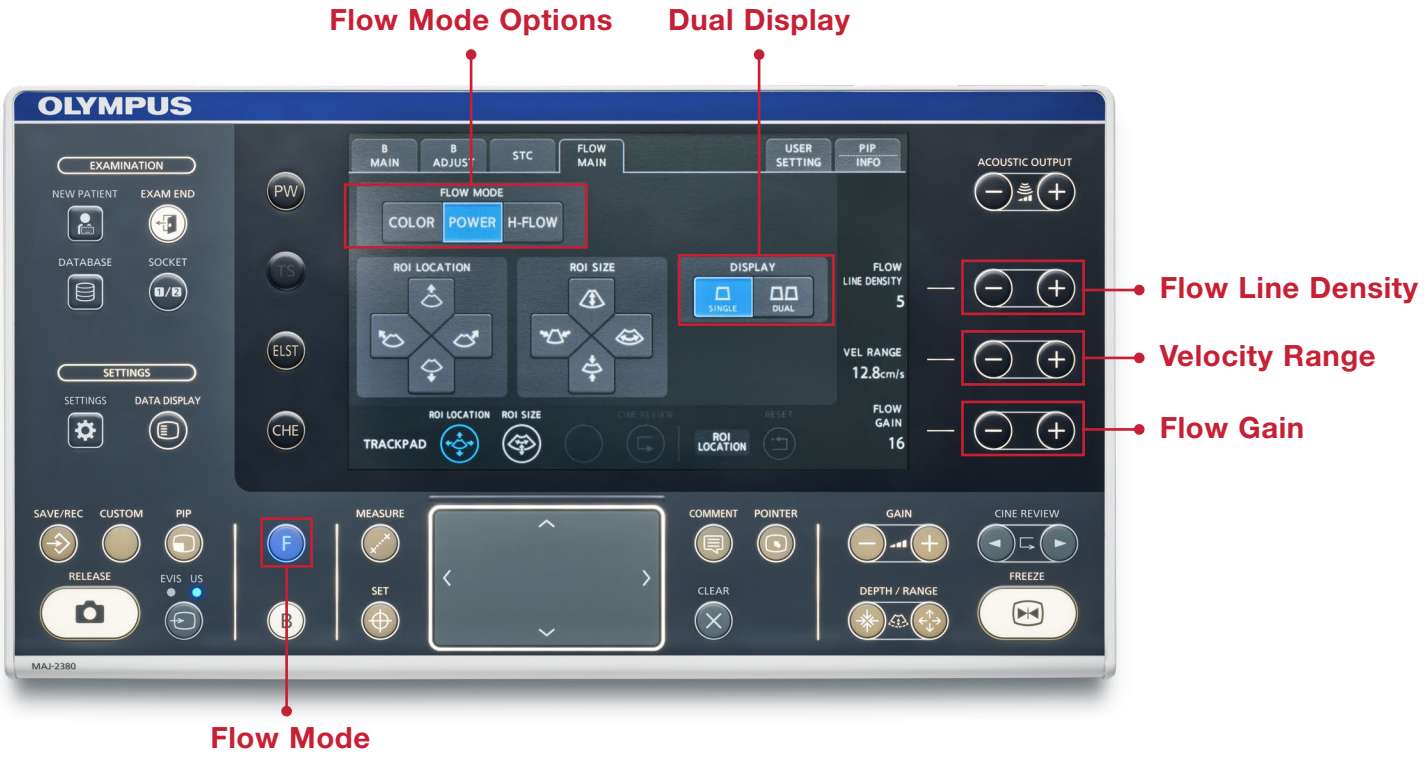
Annotation Steps



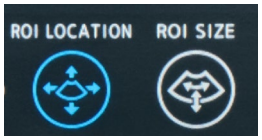
1. **FREEZE** image.
2. Press **COMMENT.**
3. Move cursor to desired location using **TRACKPAD.**
4. Enter comment by
   a. Typing on touch screen **keyboard.**
   b. Choosing **frequently used annotations** along the top of the touch screen.
   c. Choosing from the **programmed dictionary.**
      - Press the button to display the dictionary.
      - There may be multiple pages to scroll through.

DOPPLER

Flow Mode Controls

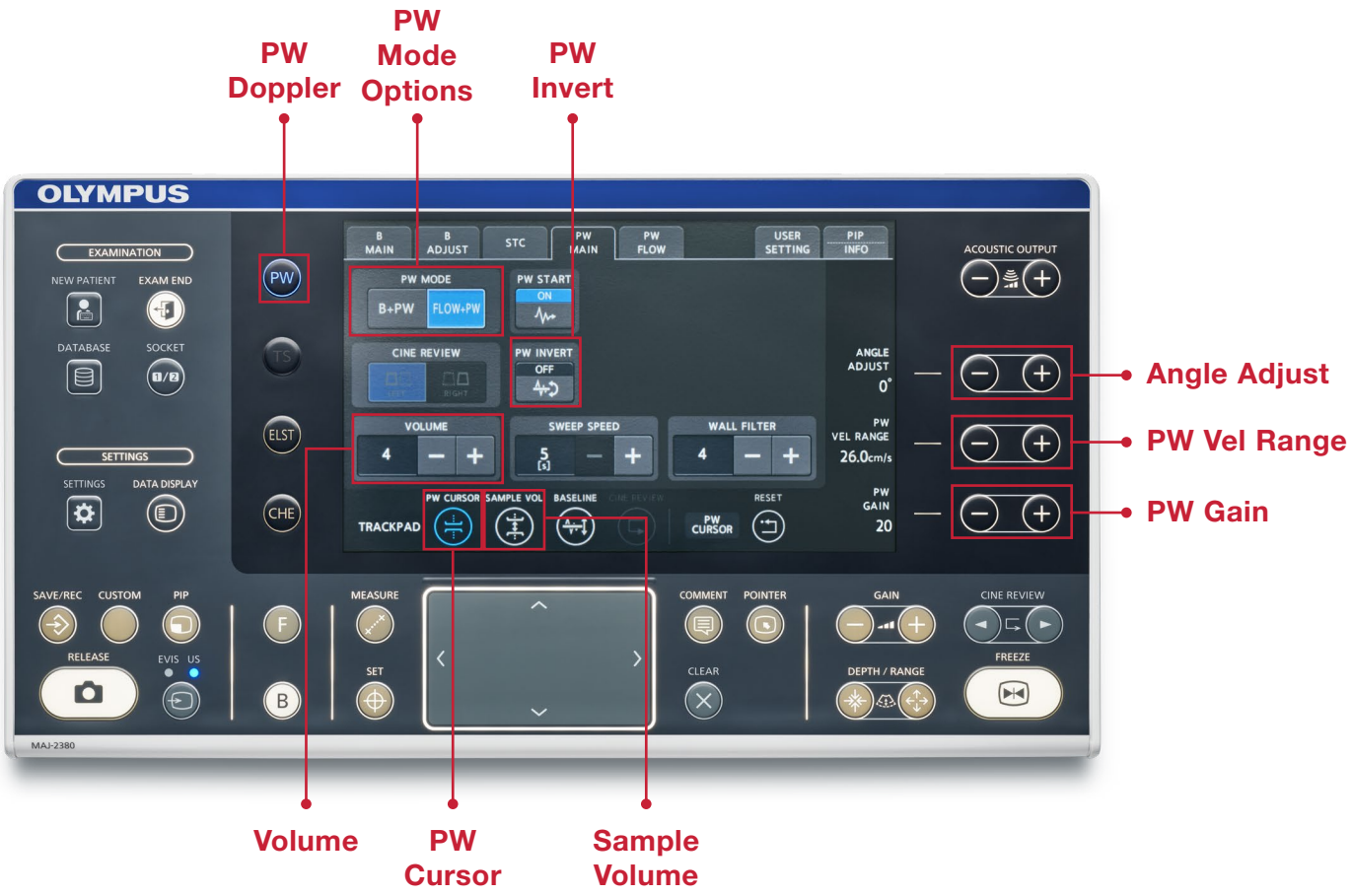


- **F MODE (Flow Mode)** - Activates Color Doppler.
- **FLOW MODE Options** -
  - **COLOR** - Displays the direction and velocity of blood flow.
  - **POWER** - Displays the intensity (amplitude) of blood flow.
  - **H-FLOW** - Displays directional blood flow with less blooming and allows for imaging of small vessels.
- **DUAL DISPLAY** - Displays both grayscale and color images simultaneously.
- **FLOW LINE DENSITY** - Adds scan lines to the Flow Mode image when increased but decreases the frame rate.
- **VELOCITY RANGE** - Adjusts the blood flow detection range to allow for faster or slower flow rates.
- **FLOW GAIN** - Adjusts the blood flow detection sensitivity.



The location and size of the area displaying blood flow (ROI) can also be adjusted via the trackpad. Tap the trackpad to switch between adjusting ROI LOCATION and ROI SIZE.

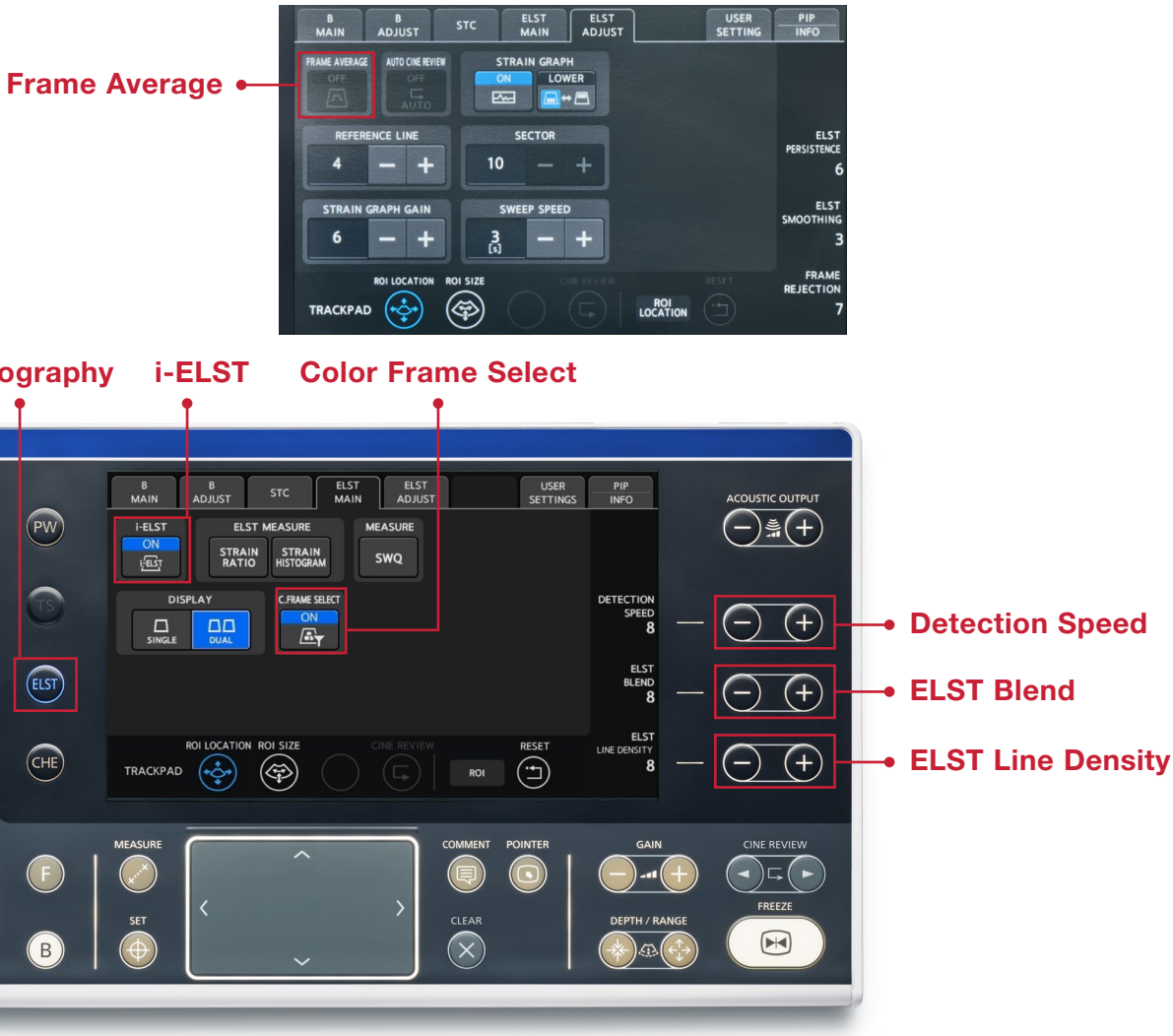
PW Mode Controls



- **PW MODE (Pulsed Wave Doppler)** - Measures the velocity of blood flow and displays the waveform.
- **PW MODE Options** -
  - **B+PW** - B Mode image with PW Mode (no color).
  - **FLOW+PW** - Flow Mode and PW Mode combined (color displayed).
- **PW CURSOR** - When the trackpad is swiped, the PW Cursor and Sample Volume move in the same direction.
- **SAMPLE VOL (Sample Volume)** - Amount of blood flow or region being analyzed. Press the SAMPLE VOL button in the trackpad section to adjust the sample volume width.
- **PW INVERT** - Moves the wave form above or below the baseline.
- **VOLUME** - Sound of the arterial or venous blood flow.
- **ANGLE ADUST** - Adjusts the angle of the sample volume within the vessel.
- **PW VEL RANGE** - Adjusts the blood flow detection range to allow for faster or slower flow rates.
- **PW GAIN** - Increases or decreases the brightness of the waveform.

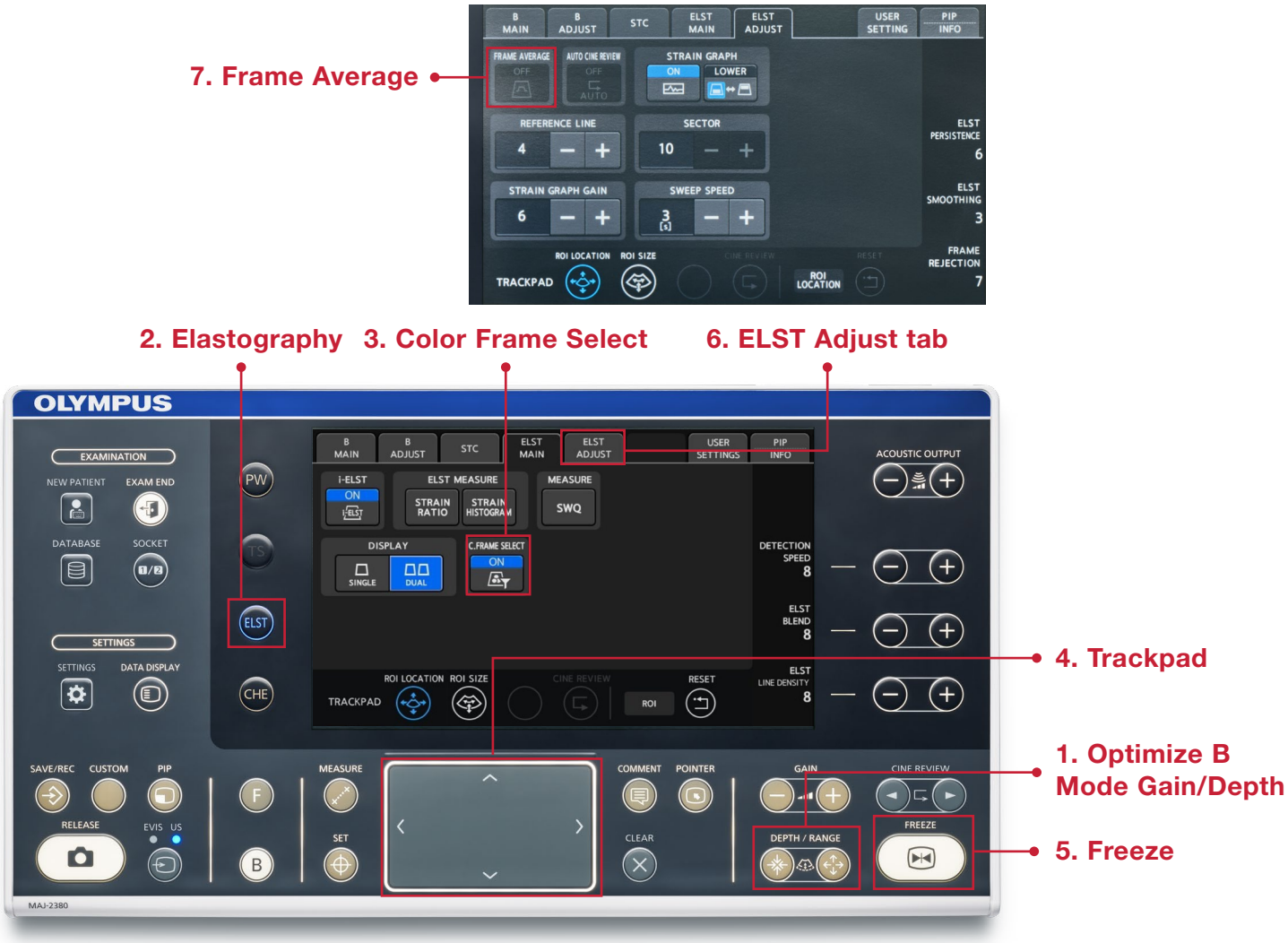
ELASTOGRAPHY

Elastography Controls

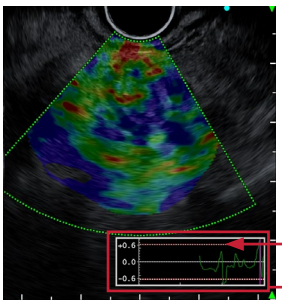


- **ELST (Elastography)** - Visualizes the amount of relative strain in the tissue (tissue stiffness) during compression and retraction, making it possible to obtain more information about tissue properties.
- **i-ELST** - Effectively displays ELST color maps, even when tissue displacement is modest. This defaults as on.
- **DETECTION SPEED** - Adjusts the frequency at which the ELST image is updated.
- **ELST BLEND** - Adjusts the transparency of the ELST image overlaid on the B Mode image.
- **ELST LINE DENSITY** - Adds scan lines to the ELST image when increased but decreases the frame rate.
- **C. FRAME SELECT (Color Frame Select)** - Selects the image for cine memory playback when the strain graph is displayed.
  - **ON:** Only the colored frames are played back.
  - **OFF:** All frames are played back.
- **FRAME AVERAGE** - Averages the frames within the sector box to produce one elastography image.
  - Move the sector box to the desired area on the strain graph and then press Frame Average.

Elastography Steps



1. Obtain a good B Mode image (**GAIN** and **DEPTH/ RANGE** optimized) with respiration or cardiac motion perpendicular to the ultrasound beam.
   - Do not intentionally compress.
2. Press the **ELST** button.
3. Verify that **C. FRAME SELECT** is ON.
4. Adjust the ROI position and size using the **TRACKPAD.**
   - Tap the trackpad to switch between adjusting ROI LOCATION and ROI SIZE.
   - Include normal gastric/duodenal wall.
   - Omit fluid-filled structures.
5. **FREEZE** image.
6. Press the **ELST ADJUST** tab.
7. Press **FRAME AVERAGE.**

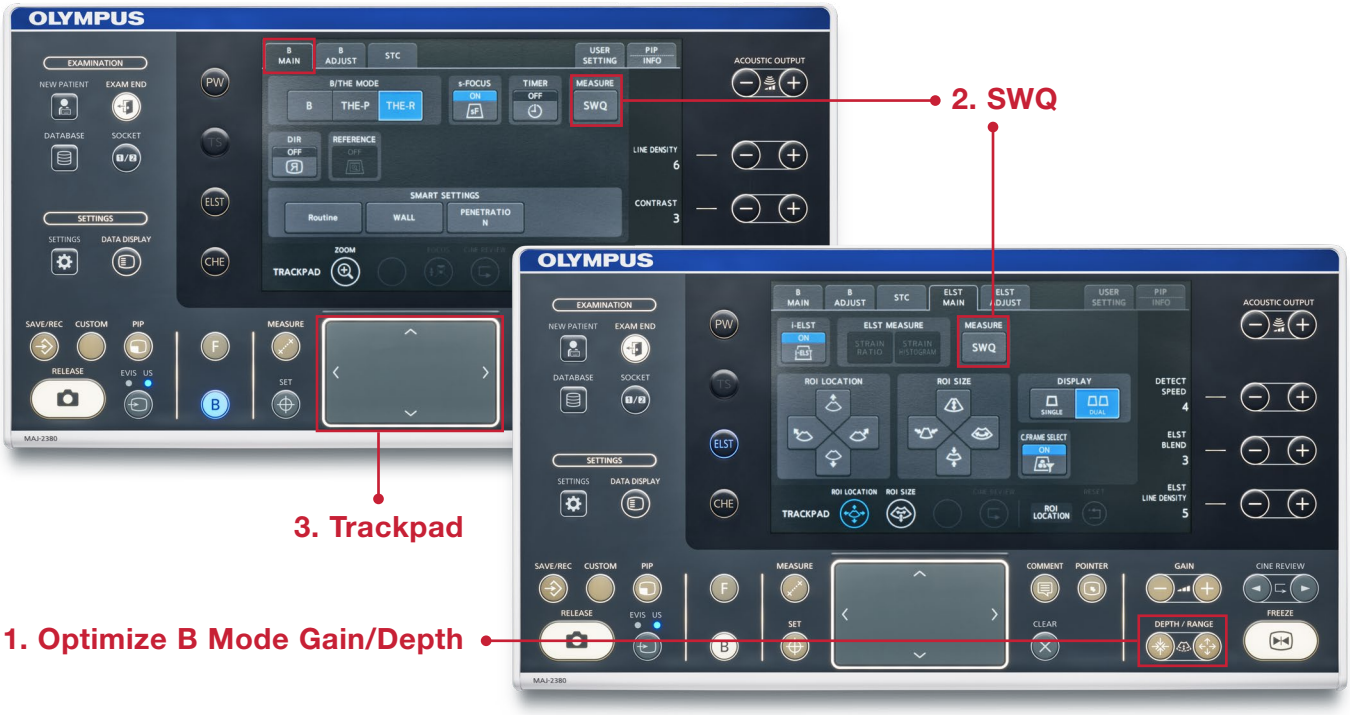


The goal is to obtain at least one sine wave that does not go above or below the reference lines on the strain graph.

SHEAR WAVE QUANTIFICATION

GI ONLY

Shear Wave Quantification Steps



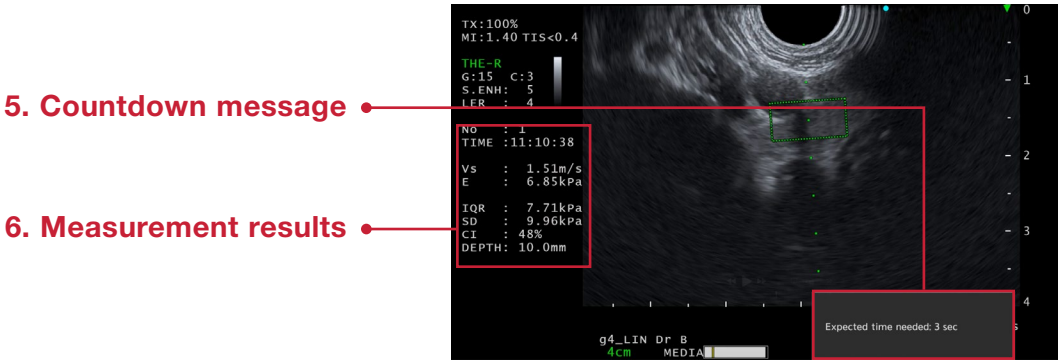
SWQ (Shear Wave Quantification) - Provides an absolute value of tissue stiffness within a region of interest by calculating the propagation velocity of shear waves, generated from a push-pulse.

1. Obtain a good B Mode image (**GAIN** and **DEPTH/RANGE** optimized).
   - Apply only comfortable contact to avoid falsely increasing kPa or Vs outputs.
2. While the ultrasound image is live, press the **SWQ** button under either the **B MAIN** tab or **ELST MAIN** tab.
   - The touch panel screen will then display the SWQ measurement menu.
3. Place the ROI <2 cm deep. Adjust the ROI position and size using the **TRACKPAD** to avoid vessels or cystic areas.
   - Pinch in and out on the trackpad to adjust the ROI SIZE.

CAUTION: Do not use SWQ while using the contrast agent. If SWQ is required, confirm that microbubbles have sufficiently disappeared first. There is a risk that cavitation may be produced by the interaction between the acoustic pressure of ultrasound and the contrast agent, which may injure the patient's tissue or result in bleeding.

WARNING: Do not perform SWQ during puncturing or the interposition of any other type of metal. The unknown effects of shear waves and unintended ultrasound image freezing for ultrasound transducer cooling may cause problems for the procedure.

Shear Wave Quantification Steps



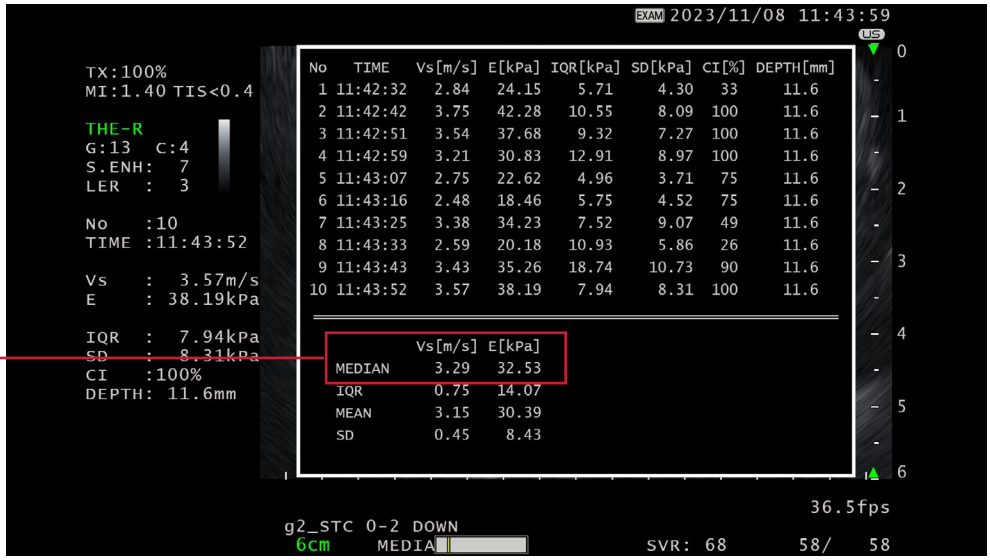
4. While holding the scope still, press the **PERFORM SWQ** button to obtain a measurement.
5. Once the SWQ ultrasound transmission is complete, the ultrasound image will freeze, and a countdown message will appear on the display.
6. After the 3 second cool-down period, the measurement results will appear, and an image will automatically be saved to the hard drive.
   - Patient data must be entered in order to save images to the hard drive.
7. Press the **FREEZE** button to unfreeze the image.
8. Repeat steps 4-7 until 10 measurements from the same area are achieved.

Shear Wave Quantification Steps

9. Press **LIST RESULT** to review the 10 measurements.
   - The reported value is the median E (kPa).
   - Reset Result will clear all measurements.
   - Clear Latest Results will clear the last measurement.
10. Press the **SAVE/REC** button on the keyboard to store an image of the results.
   - Save CVS (ALL) will save the measurement results in a CSV file.
11. To exit SWQ, press **CLOSE** on the touch panel.

GI ONLY

Shear Wave Quantification Measurement Results



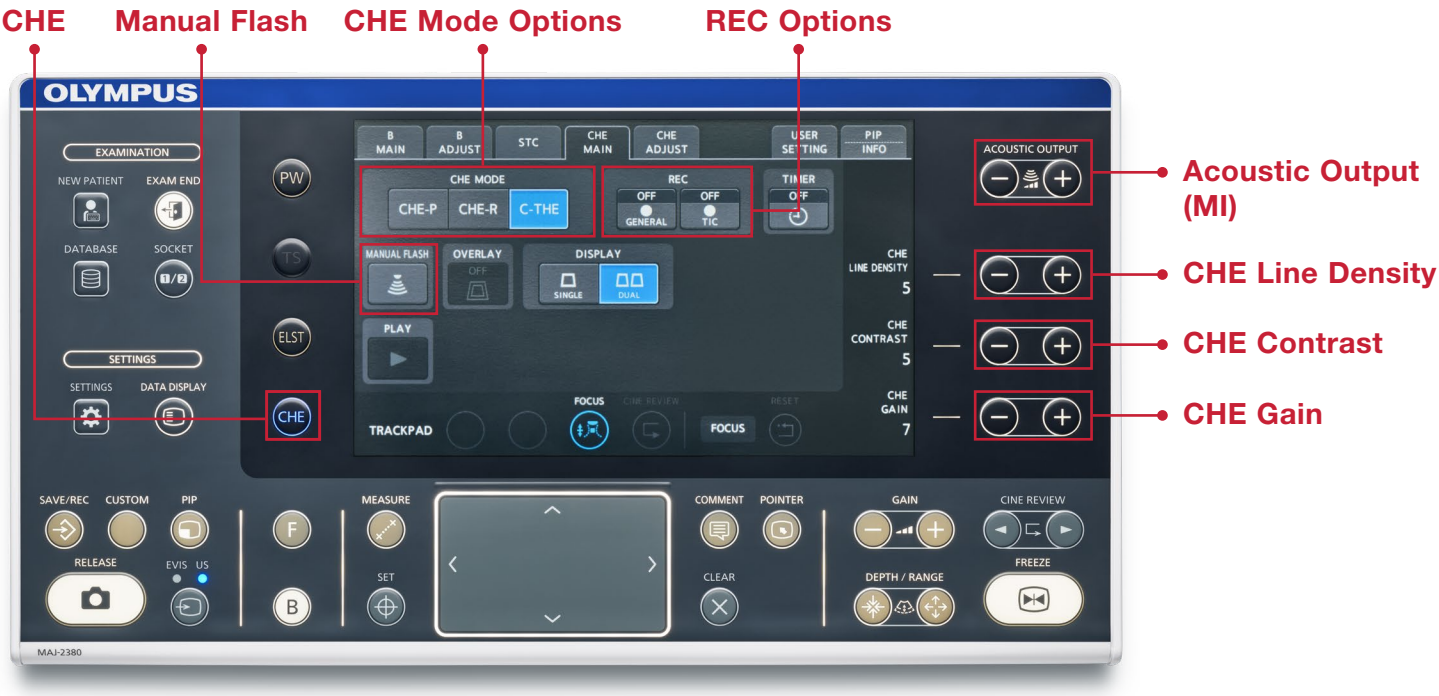
Median E (kPa)

The reported value is the median E (kPa).

Display Items	
Measurement Results	**Description**
No	Displays a serial number for performances of SWQ.
TIME	Displays the time when the SWQ measurement was confirmed in 24 hour format (hh:mm:ss).
Vs	Displays the median value of the shear wave propagation velocity (m/s] measured in the SWQ ROI.
E	Displays the median value of the modulus of elasticity lkPal measured in the SWQ ROI.
IQR	Displays the interquartile range of the group of measurement values in the SWQ ROI.
SD	Displays the standard deviation of the group of measurement values in the SWQ ROI.
CI	Displays the availability of measurement points acquiring the Vs group in the SWQ ROI.
DEPTH	Displays the distance [mm] from the surface of the ultrasound transducer to the center of the SWQ ROI.

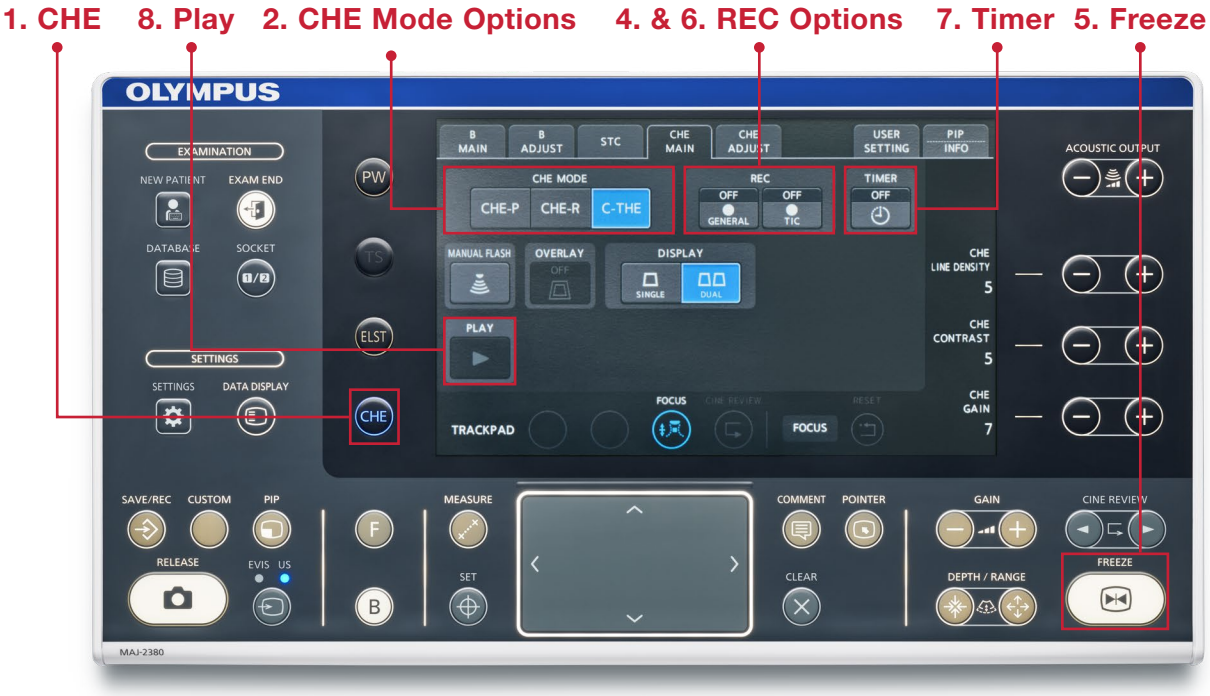
CONTRAST HARMONIC ECHO

Contrast Harmonic Echo Controls



- **CHE (Contrast Harmonic Echo)** - Visualizes harmonic components from ultrasound contrast agents to observe tissue vascularity.
- **CHE MODE Options** -
  - **CHE-P** - Penetration priority mode.
  - **CHE-R** - Resolution priority mode.
  - **C-THE** - Simultaneously images the signal from tissue and the contrast agent.
- **MI (Mechanical Index)** - Adjusted using the ACOUSTIC OUTPUT button. MI indicates the degree to which ultrasound can cause mechanical effects. Higher MI increases the brightness of the contrast agent and the depth of penetration. It also increases the mechanical stress, which makes the contrast agent more fragile.
- **CHE LINE DENSITY** - Adds scan lines to the CHE and fundmental images when increased but decreases the frame rate.
- **CHE CONTRAST** - Adjusts the levels of gray in the CHE image.
- **CHE GAIN** - Adjusts the brightness of the CHE image.
- **REC (Recording Options)** -
  - **GENERAL** - Records video clips of the ultrasound images to the system's hard drive.
  - **TIC** - Records video clips for TIC analysis to the system's hard drive.
- **MANUAL FLASH** - Sends high acoustic pressure (flash) to disrupt the contrast agent.

Contrast Harmonic Echo Steps



1. Activate **CHE.**
   - Patient data must be entered in order to record video clips during CHE.
2. Choose a **CHE MODE.**
3. Inject the contrast agent.
4. After injecting the contrast agent and at the start of the saline flush[1], select the preferred **REC** Option (**GENERAL** or **TIC**).
   - The **TIMER** will automatically start.
5. Visualize the contrast agent as it washes in and out and assess the enhancement patterns in the image. **FREEZE** the image when complete.
   - If using the TIC option, the recording will automatically stop and store to the hard drive after freezing the image.
6. To stop the **GENERAL** recording, press the **GENERAL** button.
7. Stop the **TIMER** by pressing it on the touch screen.
8. Use **PLAY** to review your recording.

CAUTION: Do not use SWQ while using the contrast agent. If SWQ is required, confirm that microbubbles have sufficiently disappeared first. There is a risk that cavitation may be produced by the interaction between the acoustic pressure of ultrasound and the contrast agent, which may injure the patient's tissue or result in bleeding.

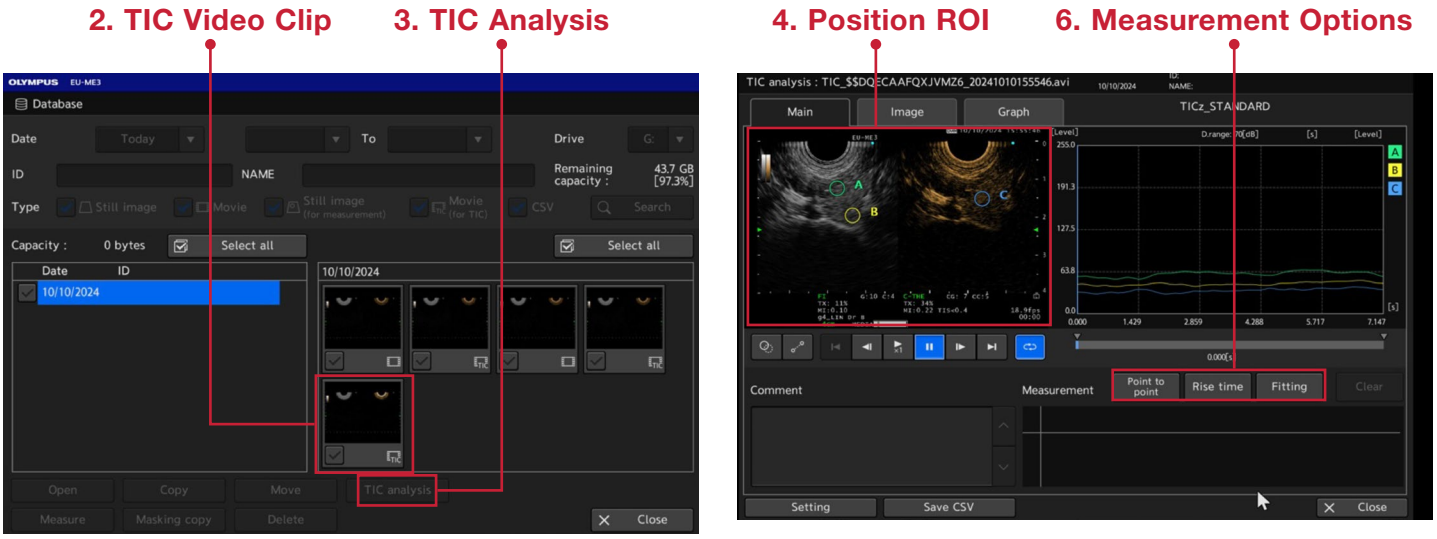
CAUTION: When handling the contrast agent, follow the instructions in the contrast agent's package insert and the instruction manual. Olympus will not assume any liability injuries inflicted on the patients resulting from misuse or inappropriate application of the contrast agent.

1. Please refer to the administration instructions for the ultrasound enhancing contrast agent being used. A saline flush is required when using LUMASON® ultrasound enhancing agent: https://imaging.bracco.com/sites/braccoimaging.com/files/technica_sheet_pdf/us-en-2021-12-14-spc-lumason.pdf

GI ONLY

Contrast Harmonic Echo TIC Analysis

TIC Analysis – Displays a time change graph of average brightness values (TIC) for each ROI placed on the ultrasound image.



1. Press the **DATABASE** button on the keyboard. 
2. Select a video clip for review.
3. Select **TIC ANALYSIS.**
4. Position ROI in desired location using the **TRACKPAD**.
5. Press **SET**.
6. Brightness measurement options include: Point to Point, Rise Time, and Fitting.

Reach out to your local Olympus Clinical Applications Specialist for more information regarding CHE and TIC Analysis.

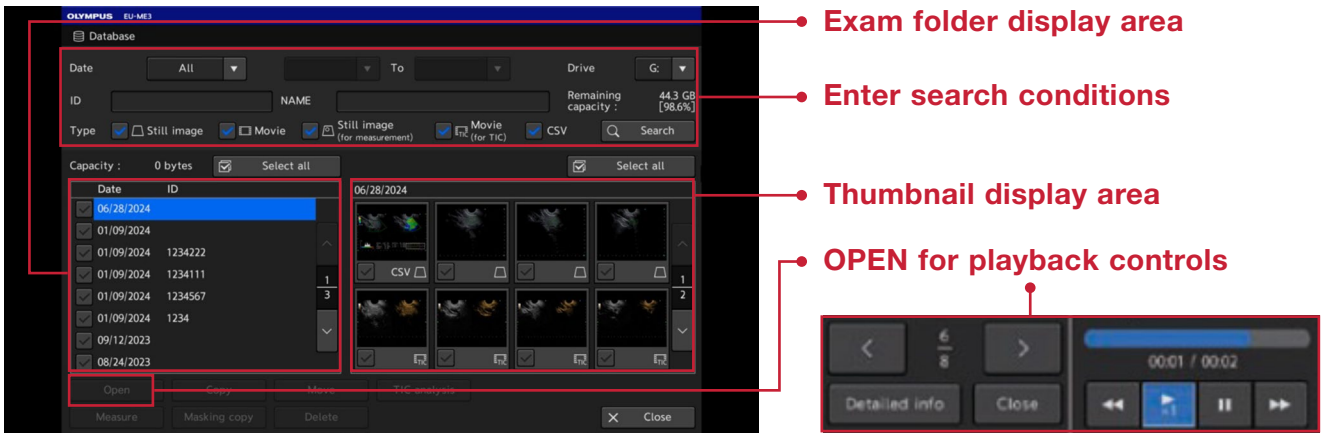
DATA MANAGEMENT

Image/Video Storage and Management

SAVE/REC

Press the **SAVE/REC** button to store images to the internal memory.

- When the image is frozen, a single, still image will be stored.
- When the image is live, a video clip will be recorded and stored.



DATABASE

The database allows for the following operations:

- Searching for and selecting data.
- Playing back selected data.
- Copying selected data/folder.
- Masking selected data/folder.
- Moving selected data/folder to an external storage device.
- Deleting selected data/folder.

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At Olympus our partnership doesn't end after the product is shipped.

The point of transition signals a new phase of the relationship we have with our customers: one that is built on the trust and confidence we offer through a dedicated and committed team of support personnel.

Olympus Technical Assistance Center

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Printed in USA OAIEUS0425QRG55941