

Application News



AFI

on

Vivid™ iq

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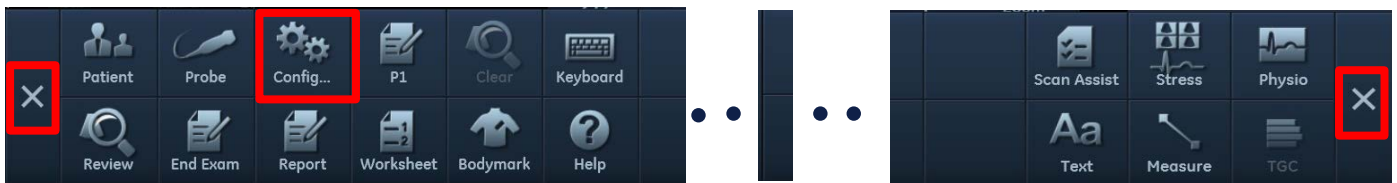
NOTE

This hand out is a summary and is not comprehensive.
 For more detailed information, please refer to the user manual and/or reference manual.

AFI

Configuration

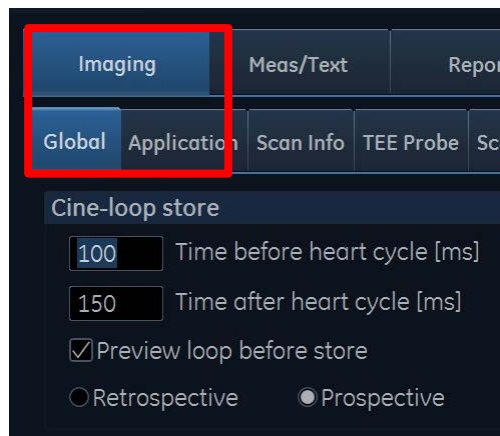
Expand the short cut Menu by using the X on either side left/right, on the bottom of the monitor
Tap on the Config button.



The following configurations only need to be done once on the system.

Image capture

Select Imaging from the Main Topics (upper Tabs) and choose the Global Tab.
These settings will apply globally to all probes and presets.



Time before heart cycle / Time after heart cycle

Using an ECG the system detects automatically one heart cycle. Additional ms before and after the trigger points need to be stored to make sure a bit more than a complete heart cycle is captured.

For using AFI it is recommended to enter **100 ms** in each field, before and after.

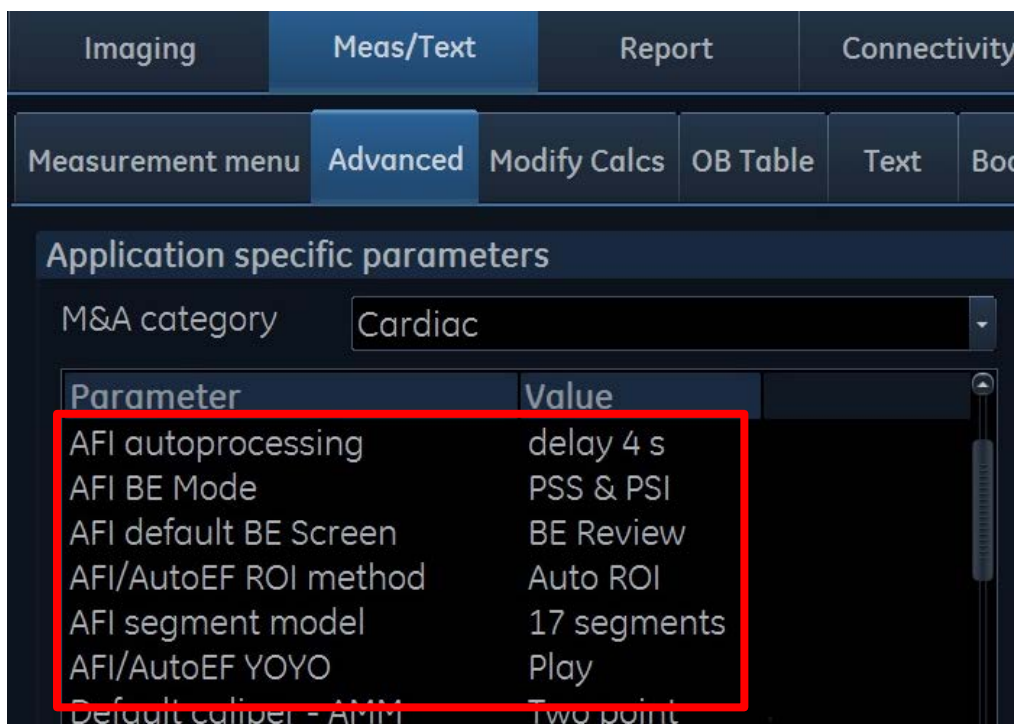
Preview Loop before store

If check marked, the system will show a preview of the loop after pressing the **Image Store** button and before finally storing the cineloop into the archive. This might be helpful to double check if the loop that gets stored is suitable to the user's needs/preferences, potentially avoiding storing non-useful images.

AFI configuration

Select Meas/Text from the Main Topics and choose the Advanced Tab.

Scroll down and find the following selections:



AFI auto processing

It represents the time delay after the region of interest (ROI) is displayed and before the system starts processing AFI. This time allows checking the contours and doing some more adjustments if needed.

AFI BE Mode - PSS/PSI

Select which parameter(s) should be shown with the BE maps.

PSS Peak Systolic Strain.

The system detects the peak longitudinal strain values **in systole**.

PSI Post Systolic Index

The system detects the peaks longitudinal strain values in systole and the overall peak value during the hear cycle, which can appear after systole.

It indicates how much post systolic shortening a segment has.

AFI default BE Screen

The user can define the information that will be displayed when the analysis is finished: either the BE with Traces from all the views or the BE with the respective 2D images.

AFI/Auto EF ROI method

Select which ROI method you would like to use: the Auto method, where the system automatically creates the region of interest (ROI) or the 3 points method to set the 3 reference points manually

AFI segment model

The BE can show either as;

- a 17 segment model, where the apical region is split only into 4 segments and an additional segment is representing the Apex.
- or an 18 segment model, which uses no averaging, but shows purely the data which was analysed. Each of the three apical views is split into 6 segments.

AFI/AutoEF Yoyo

While in the stage to set the reference points, the system is scrolling the image a bit back and forth. This should help to identify the myocardium, since usually this can be better seen in motion.

Exit

Click on Back to scan in the upper left part of the monitor or use the 2D button on the operator panel.

Getting started

Create a patient/exam.

Connect the ECG.

Tap **Physio** and change **ECG Lead** if necessary to get the best signal.

Obtain a stable ECG trace.

Optimising images

Sector width

It is recommended to choose an optimal sector width, where the entire myocardium is visible during the whole cardiac cycle but not too large as this will lower the frame rate.

The Virtual Apex function may help to see the apical segments completely without widening the sector too much.

Frame rate

Optimal between 40-90 fps.

Storage of images

Store loops from all apical views:

- Apical 4 CH
- Apical 2 CH
- Apical LAX

It is recommended to acquire all three apical views sequentially in order to get comparable heart rates in all views.

Images have to be stored first into the clipboard before starting the analysis.

Measure the AVC

There are two different methods to select from how to perform the AVC measurement.

From M-Mode

Acquire a nice M-Mode signal where the aortic valve closure is clearly visible.

Open the **Measure** Package.

Open the folder for **Event Timing**.

Select **AVC**.

Set the marker for the closure.

or

From Doppler

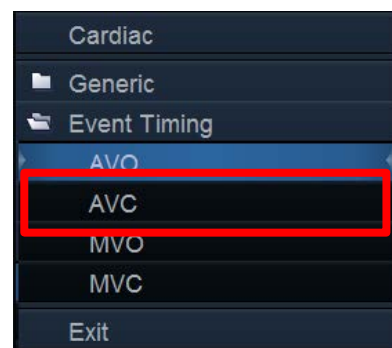
Acquire a nice Aortic Flow signal; preferably including the valve clicks.

Open the **Measure** Package.

Open the folder for **Event Timing**.

Select **AVC**.

Set the marker for the closure.



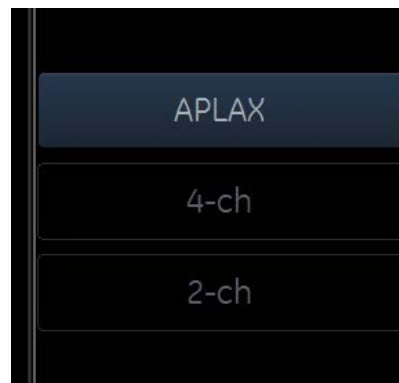
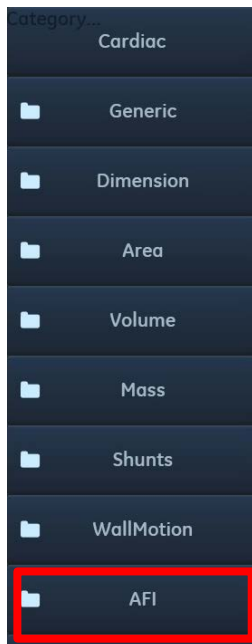
The AVC measurement is stored in the worksheet and will be used for the AFI analysis.

Starting the analysis

The measurement

Recall the **APLAX** view
Open the **Measure** Package.
In the Measurement menu, select **AFI**.

The *View selection menu* is displayed.



Select **APLAX**

It is mandatory to start with the APLAX view. This allows to visually check the Aortic Valve closure event (AVC) in the 2D image.

Defining the ROI

If the system is configured with the Auto ROI method, the region of interest will automatically be defined by the system.

If the system is configured with the 3 points method, two basal and one apical reference point need to be defined.

Follow the instructions on the pointer or in the status bar.

Correct ROI definition is crucial to get good tracking.

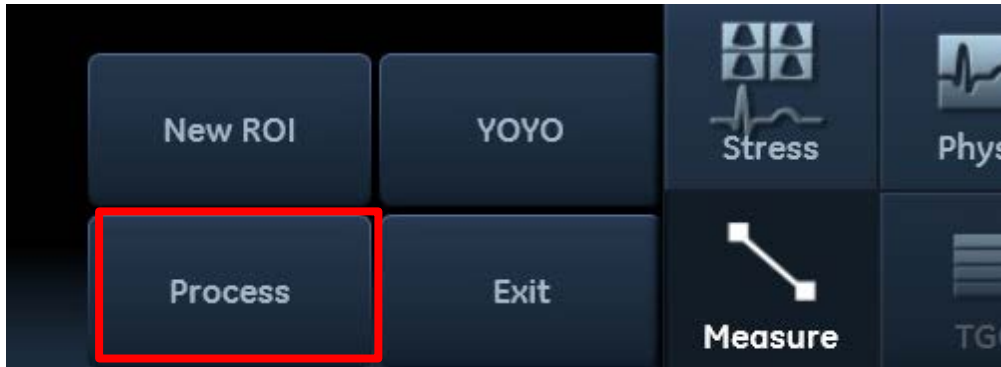
Check the ROI width in order to cover the entire myocardium, but not include unnecessary tissue.

For adjusting the ROI, use the **track pad** and **Set** button to select any of the points at the endocardial border and move the correct position.

Auto processing

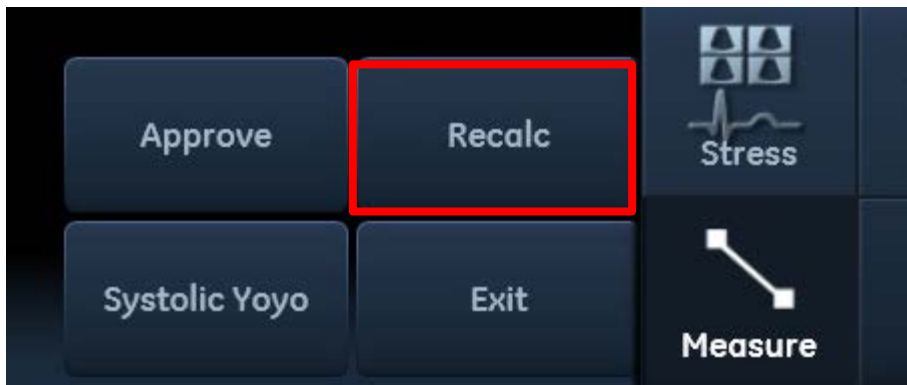
If auto processing is used, the system waits a few seconds (as configured in the AFI Auto processing parameter) without any user interaction and then starts the processing.

When auto processing is turned off the user needs to tap the **Process** button on the lower left part of the monitor, whenever ready to proceed.



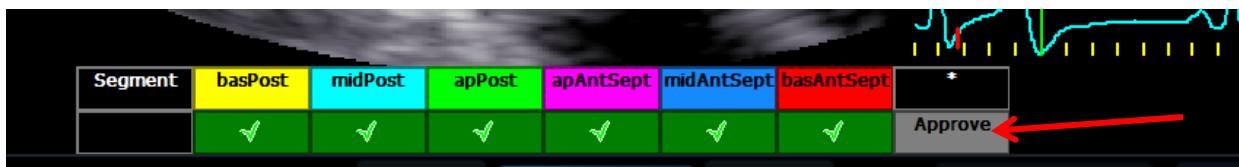
Tracking quality

Check the tracking quality. If changes on the ROI are necessary, tap **Recalc** to go one step back and adjust the ROI.



Tap **Process** to continue (see above).

Approve the scoring table once you agree with it.

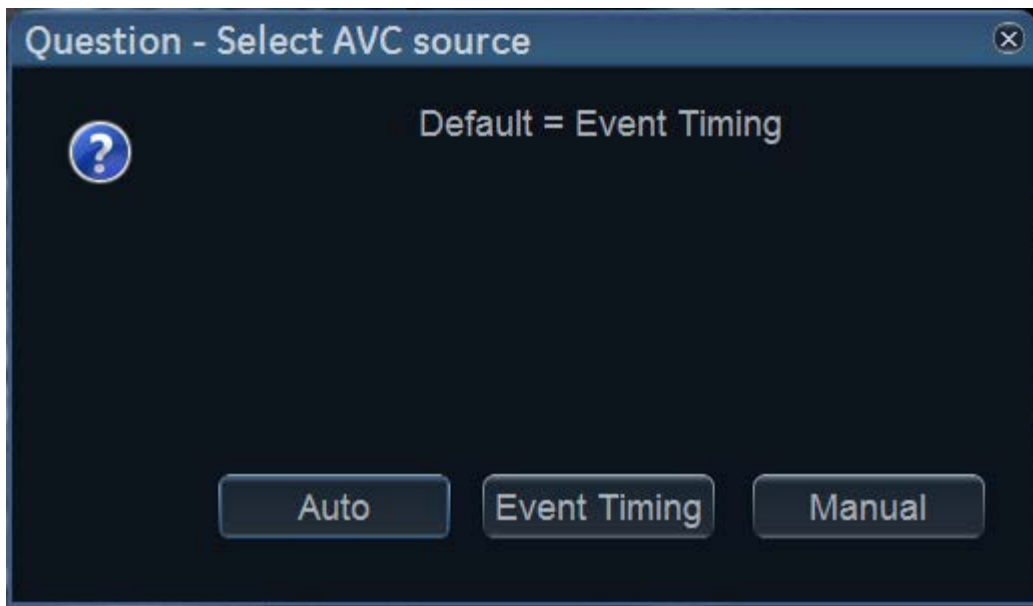


Set the AV closure

There are three ways to define the AVC:

- Measure the event timing before starting the AFI (see page 7).
- AVC is selected by the system (determined by the temporal contraction of all LV segments -strain curves).
- From the 2D image select the first frame where the AV is closed (only visible in APLAX, therefore we start with this view) and press Select.

If a message appears read carefully and make your decision.



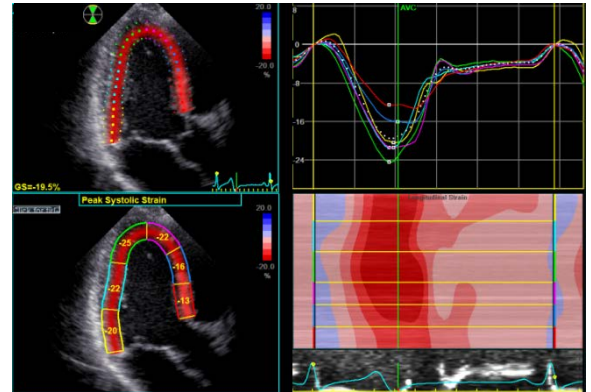
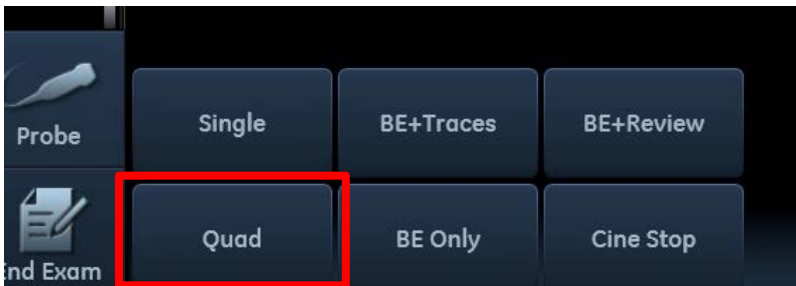
Once the AVC is defined, this will be used for the other views as well (therefore comparable heart rates are crucial).

Now the *Parametric systolic strain APLAX* view is displayed.



The quad screen

If interested in the details tap **quad** to see all information.



Press **Image store** to store the quad screen to the clipboard.

Next views

4-Chamber view

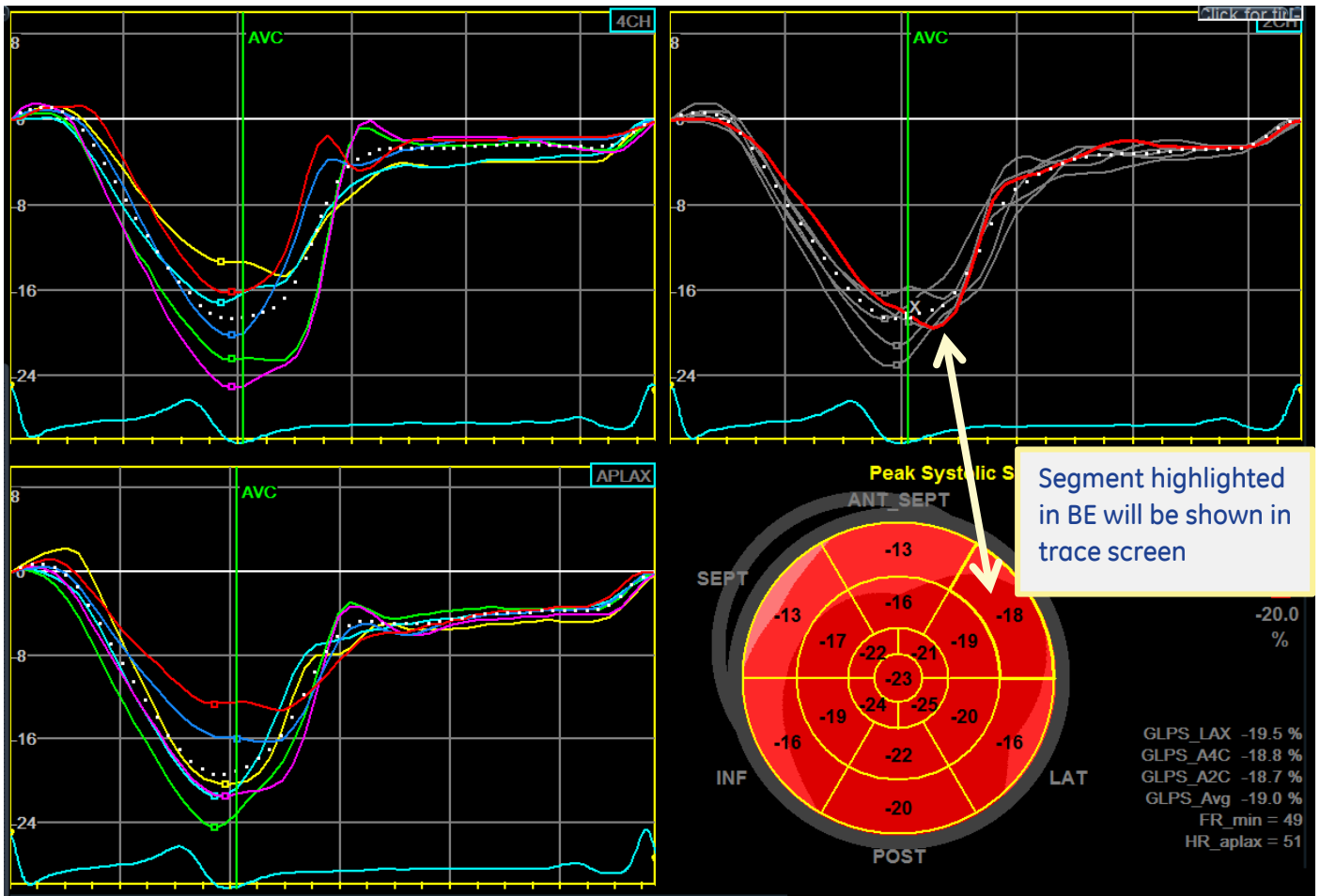
Take the 4CH view from the clipboard and repeat the procedure:
Click on 4 CH in the view selection menu.
Check the tracking quality and approve.
Enter the quad screen and store.

2-Chamber view

To finish do the same procedures for the 2 CH view:
Click on 2 CH in the view selection menu.
Check the tracking quality and approve.
Enter the quad screen and store.

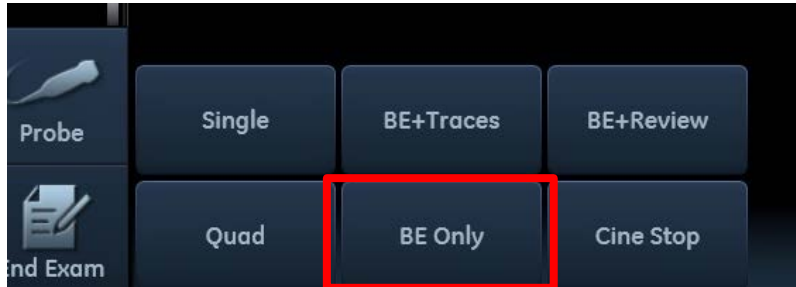
Result

Once all views are analysed, the system shows the Bulls eye and the traces from all three views. The user can hover the mouse cursor over each segment in the Bulls eye and the curve of this specific segment will be highlighted in the traces screen.



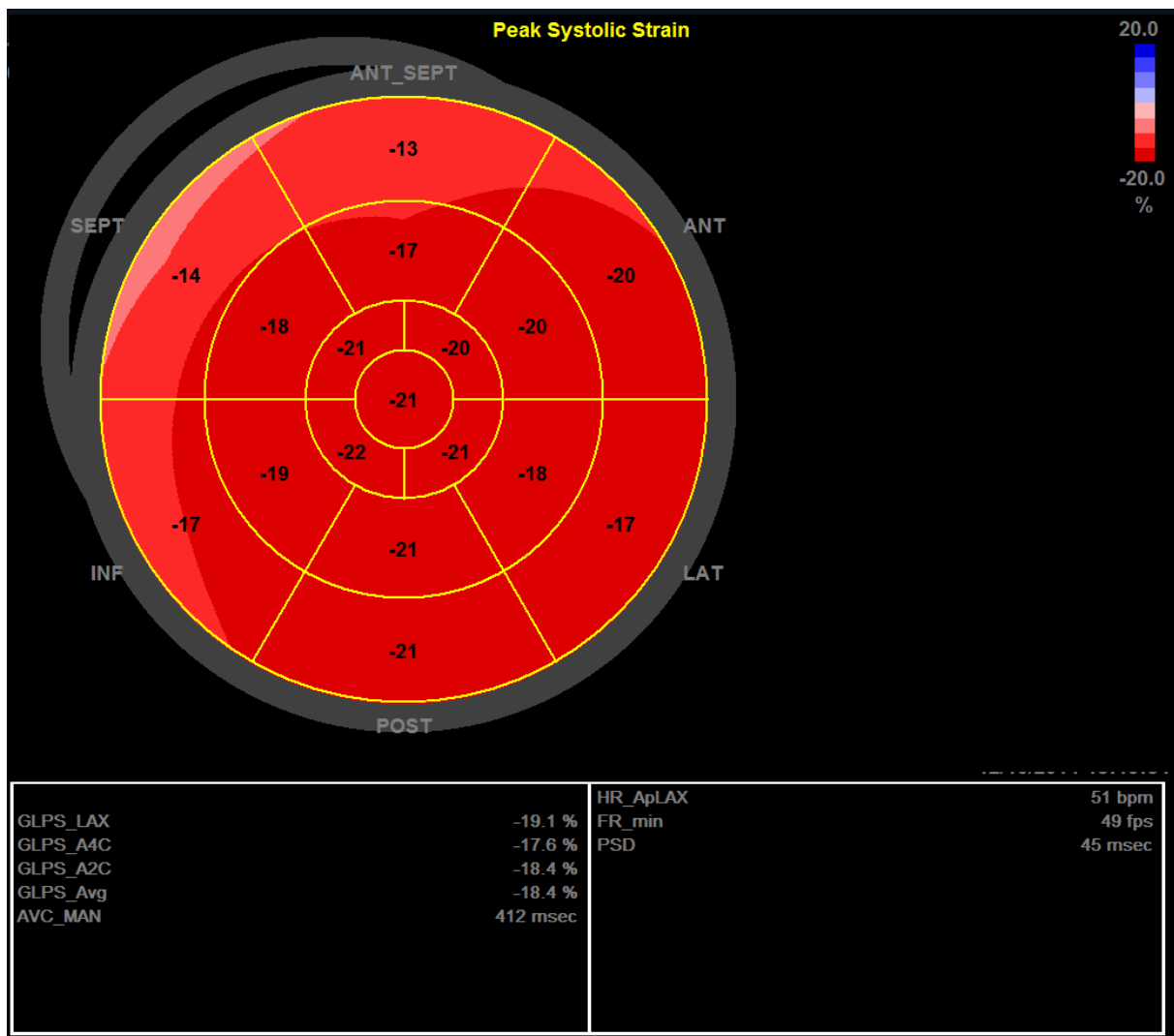
The Bull's Eye

Select **BE only** on the Monitor to display the bull's eye only screen.



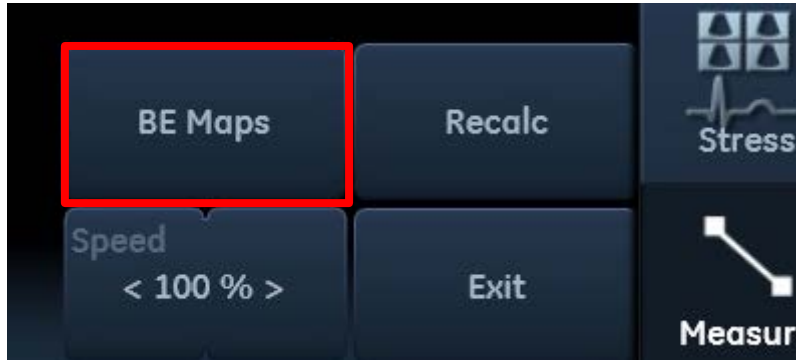
The Bull's eye can be displayed together with the following parameters:

- Global strain values for each view
- Global strain value average for the entire heart
- AVC time point
- Heart rate in APLAX and minimum frame rate
- PSD as the standard deviation of the spread of all peak values over the entire heart cycle



Alternative BE displays

Tap on **BE Maps** to get a selection of alternative BE mappings



Make your selection from the List on the monitor.

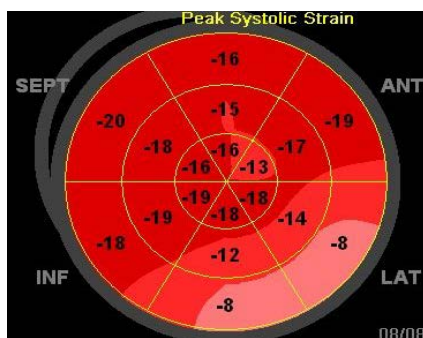


Green-yellow-red

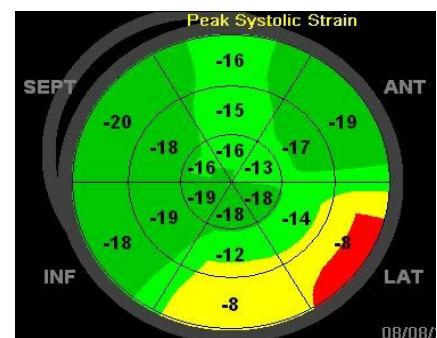
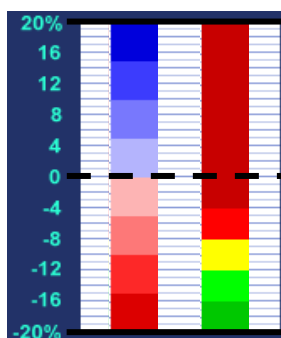
The green-yellow-red map offers an alternative to the conventional Red-Blue Map.

It uses the same numbers but with a different color overlay

It emphasizes the negative systolic strain (shortening of the myocardium) and allows a better differentiation within LV function at a glance.



Red-Blue Map



Green-Yellow-Red Map

>-8% Red
-8...-12% Yellow
<-12% Green

PSI

Post Systolic Index

It shows the amount of post systolic shortening in a segment.

Dark blue colors show higher post systolic shortening values.

Formula for the post systolic strain index:

$$PSI = 100 * (PS - ESS) / PS$$

Where:

ESS = Strain at AVC

PS= peak strain after AVC

