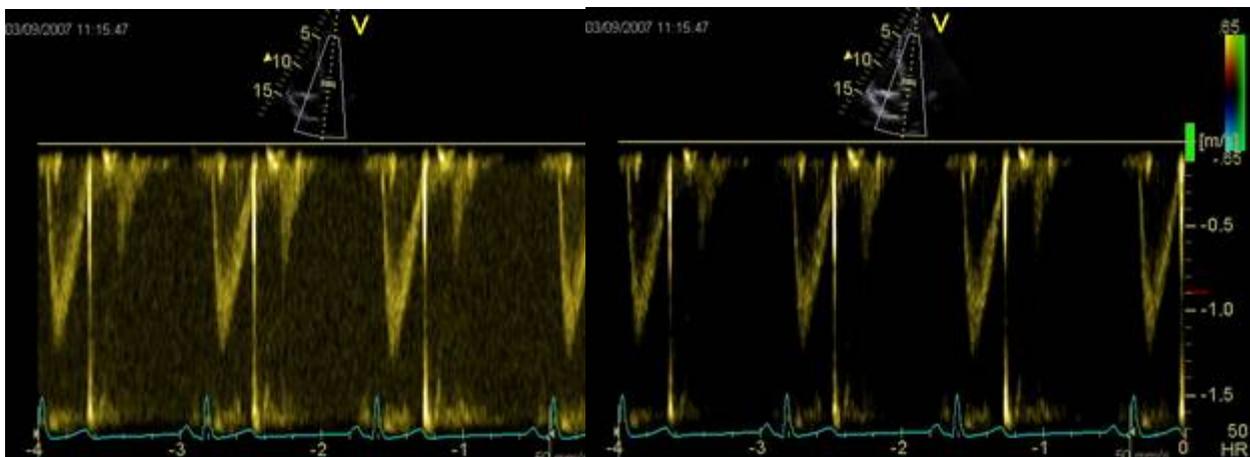
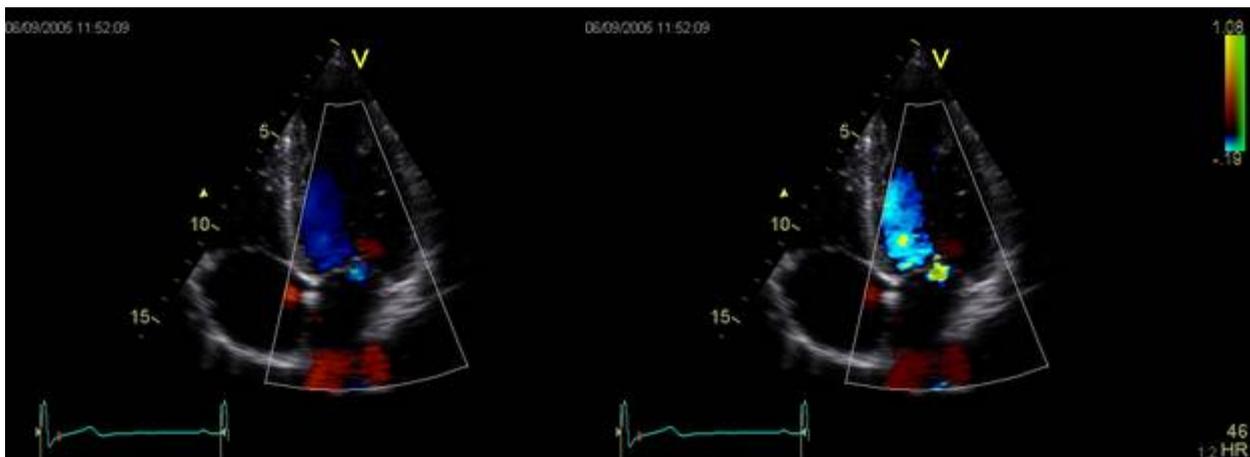


Application News



Image optimization settings



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Be aware this is a complete overview on all imaging settings for the complete product line. Depending on the system and the software level, not all of the below mentioned settings are possible.

Imaging settings for 2D

Gain

While scanning this controls the input signal level to the system. Gain changes applied to the received echo signals equally for all depth. Increasing gain results in a brighter image, but also increases the noise level. Decreasing gain makes the image darker, by decreasing the lower level tissue signal information.

TGC (Time gain compensation)

Gain adjustment related to the depth. The sliders on top affect the near field, whereas at the sliders at the bottom affect the far field. TGC amplifies returning signals to correct for the attenuation caused by tissue at increasing depths.

Dynamic range

It enables the control of the contrast of the image. Dynamic range describes the ratio between the lowest (black pixel) and highest (white pixel) signal input. More dynamic range means more gray levels in between the highest and lowest, whereas less dynamic range results in a more black and white image because of low number of gray scales.

By increasing dynamic range the image get's more gray scale and appears softer and more low-level data is visible. Therefore you see lots of details in the myocardial tissue but it also increase the noise in the chamber.

By decreasing dynamic range the images becomes contrastier, because of less gray scales. This will reduce the noise in the chamber but it makes the differentiation in soft tissue more difficult.

Compression

Adjust the amount of contrast in the 2D image. Compress an original echo signal dynamic range to fit the display dynamic range to show its image with better balance.

Increasing compression gives a softer image.

Decreasing compression makes the image more black and white

Reject

Low -level echoes are rejected and appear darker in the 2D image.

By using the reject function noise can be removed to some level but in the same time soft tissue signals maybe eliminated.



Frame rate

Frame rate controls the trade of between spatial and temporal resolution.

Lower frame rate gives more spatial resolution caused by a higher line density (good to visualize details in structures)

Higher frame rate reduces the spatial resolution but gives more temporal resolution (i.e. higher heart rates, valve motion, etc.)

Edge Enhance

Emphasizes the image border

DDP (Data Dependent Processing)

By frame averaging it reduces random noise without affecting the motion of significant tissue structures.

UD (Ultra Definition) Clarity

UD Clarity smoothens the image and sharpens the edges. Allows the user to personalize the tissue appearance.

Speckle reduce

Image speckles usually appear as grainy texture in the otherwise uniform areas of tissue. Here you can reduce the unwanted effect of the speckles.

Too much speckle can impair image quality and make it difficult to see the desired detail in the image. Likewise, too much filtering of speckle can mask or obscure desired image detail.

Extra care must be taken to select the optimal Speckle reduction level.

Contour

Controls image processing related to the extend of edge enhancement applied to an image.

Diff on/off

Removes reverberation artefacts. When turned on, the frame rate (or number of focal zones) will decrease, while the reverberations will be attenuated.

Power

Controls the amount of acoustic power. When the power is set to maximum, it is equal to or less than the maximum acoustic power permitted by the FDA

Imaging settings for Colour

Scale

Adjusts the repetition rate of the Doppler pulses transmitted to acquire the data for colour flow mapping. The Scale (Nyquist limit) should be adjusted so that no aliasing occurs, while still having good resolution of velocities. The Nyquist limit should be somewhat above the maximum velocity found in the data.

Baseline

Adjusts the colour map to emphasize flow either toward or away from the probe. Baseline is available in both Live and Freeze.

Invert

Enables the colour scheme assigned to positive and negative velocities to be inverted. Invert is available in live and cine replay.

Variance

Controls the amount of variance data added to a colour display. Variance enables computer-aided detection of turbulent flow (e.g. jets or regurgitation). Variance is available in live and cine replay.

Tissue priority

Emphasize either the colour of the colour mode or the greyscale tissue detail of the 2D image. Tissue priority is available in both Live and Freeze.

Sample volume

Adjusts the size of the colour flow Doppler sampling area. Lower setting gives better flow resolution while a higher setting increases sensitivity and helps to locate turbulent flows.

LVR (Low Velocity Rejection)

LVR, also called Wall motion filter, enables the extent of low velocity removal to be adjusted.

Frequency

Enables the adjustment of the transmission frequency to control the sensitivity or the level of penetration. Higher settings improve resolution. Lower settings improve depth penetration and sensitivity.

The selected frequency is displayed in the status window.

Adjusting Frequency may affect Sample Volume and LVR settings.



Lateral Averaging

Smooths the image by averaging collected data along the same horizontal line. An increase of the lateral averaging will reduce noise, but this will also reduce the lateral resolution.

Radial Averaging

Smooths the image by averaging collected data along the same radial line. An increase of the radial averaging will

Imaging settings for PW / CW

Horizontal sweep

Adjusts the horizontal refresh rate of the Doppler area of the display. Horizontal sweep is available in live and cine replay.

Scale

Adjusts the velocity scale to accommodate faster/slower blood flow velocities. Velocity scale determines pulse repetition frequency.

Baseline

Enables the Doppler baseline to be shifted up and down. By adjusting the baseline a larger portion of the analysis is assigned to the flow direction present. Baseline is available in live and cine replay. Maximum velocity depends on sample volume size, sample volume position and frequency settings.

Velocity range

Enables the vertical scale of the Doppler spectrum and the maximal detectable velocity to be modified. Velocity range directly controls the pulse repetition frequency, which is responsible for the setting of the Nyquist limit (the ability to detect maximum velocity without aliasing).

Low velocity reject

Enables the low velocity portions of the spectrum to be filtered, since the Doppler spectrum and audio may contain strong wall-motion signals. The green vertical bar at the right end of the baseline indicates the amount of Low Velocity Reject. Adjust Low velocity reject to reduce unwanted low velocity blood flow and tissue movement



Invert

Enables the Doppler spectrum to be flipped 180 degrees, so that negative velocities are displayed above the baseline and positive velocities below the baseline.

Invert is available in live and cine replay.

LPRF (PW mode)

Sets the pulse repetition frequency for the PW Doppler acquisition of flow data.

Enables toggling between high and low Pulse Repetition Frequency (PRF).

When the Doppler PRF is raised beyond a certain limit, more than one Doppler gate is displayed on the screen.

Sample volume

In PW mode, set the longitudinal size of the region to be sampled for measurement.

Adjusting Sample volume may affect the PRF (Nyquist limit) settings.

SV does not apply to CW mode, where the volume sampled is the full length of the area indicated by the cursor line.

Compress

Enables control over the contrast of the Doppler spectrum.

When compression is raised, the spectrum image becomes softer and some low-level background noise may appear.

Compress is available in both Live and Freeze.

Reject

Enables undesirable background noise to be removed from the Doppler spectrum resulting in a darker background.

Reject is available in both Live and Freeze.

Frequency

Adjusts the transmission frequency in Doppler to control sensitivity or level of penetration. The selected frequency is displayed in the status window.

Adjusting Frequency may affect Sample Volume (PW) and LVR settings.

NOTE

This hand out is additional training material.

For more information please refer to the user manual and/or reference manual.

