Rev. M

May 2015

# MyLab

ADVANCED OPERATIONS

**OPERATOR MANUAL**

***Doc# 81B16EN13***

# Introduction

This manual describes the operations and describes available optional packages for the **MyLabOneVet** and **MyLabSatVet,** referred to as **MyLab** throughout this manual.

This manual is composed of the following sections:

- Section 1: Software Keys (SK)
- Section 2: Calculations (CA)
- Section 3: Archiving (AR)
- Section 4: System Configuration (SC)
- Section 5: MyLibrary (ML)
- Section 6: Needle Guides (SP)

In this manual control panel keys and software keys are indicated using the following graphical conventions:

Control panel keys are indicated by **BLUE CAPITAL LETTERS.**

**WARNING**

In this manual a **WARNING** pertains to possible injury to a patient/operator.

**CAUTION**

In this manual a **CAUTION** describes the precautions, which are necessary to protect the equipment.

**Be sure to understand and observe each of the cautions and warnings.**

# SOFTWARE KEYS SECTION

This section lists the software keys available in the various modes, in Freeze and for remote control of the video recorder. It also gives some tips on how to use the controls available to optimize image quality.

The section is organized as follows:

- Chapter 1: B-Mode

  This chapter lists the software keys available in B-Mode and explains how to use them to optimize the image.

- Chapter 2: M-Mode

  This chapter lists the software keys available in M-Mode.

- Chapter 3: Doppler

  This chapter lists the software keys available in PW Doppler format and explains how to use the controls available to optimize image quality.

- Chapter 4: Color Flow Mapping (CFM) and Power Doppler (PWR D)

  This chapter lists the software keys available in Color Flow Mapping and explains how to use them.

- Chapter 5: Freeze

  This chapter lists the software keys available in Freeze and explains how to use them.

- Chapter 6: Body Marks

  This chapter explains how Body Marks are organized and how to use them.

- Chapter 7: Annotations

  This chapter explains how to use the annotation function both by word and by sentence.

- Chapter 8: User Presets

  This chapter lists the parameters that are available in the User Preset option and explains how to configure them.

# Table of Contents

Chapter 1

# 1 - B-Mode

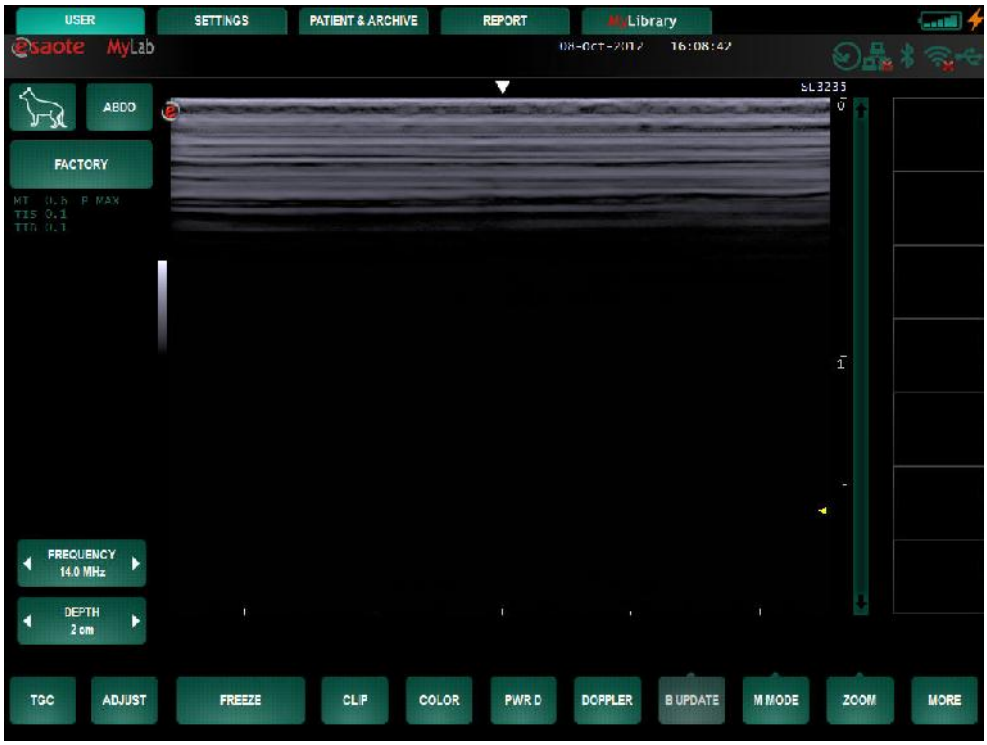
This chapter lists the software keys available in B-Mode format and how best to use them to optimize the image quality.

## Activation of B-Mode Format

The system activates automatically the B-Mode format each time the system is switched on. The 2D format can be redisplayed when deactivating any other mode.

## Control Panel Keys in B-Mode on MyLab

Upon activation, the following screen image will be visible:



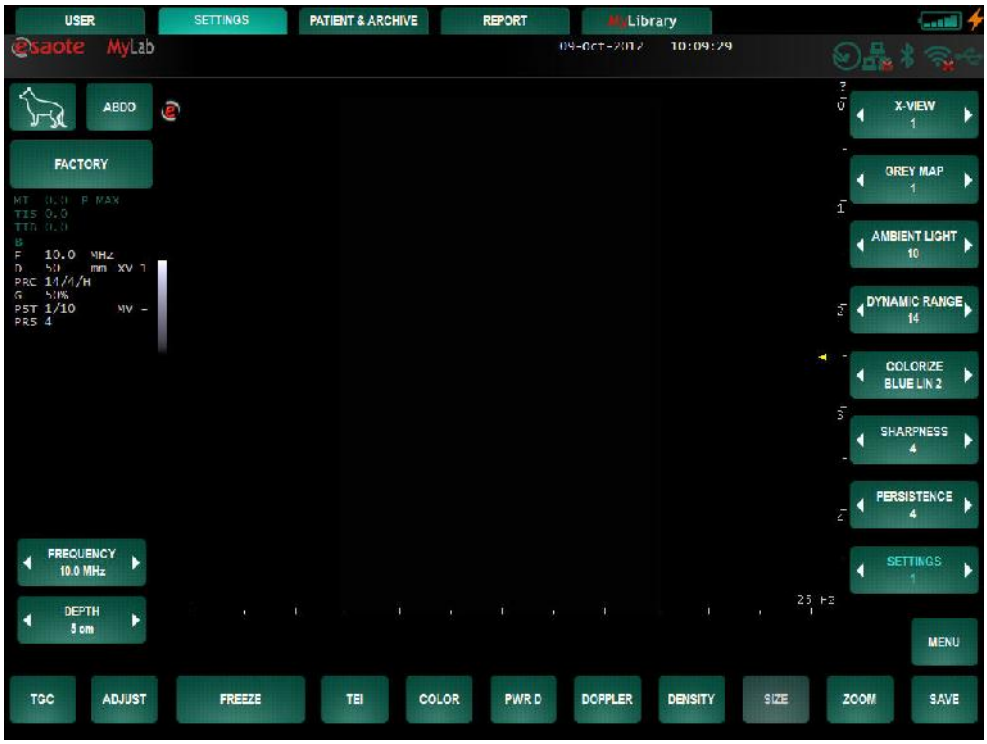
In B-Mode, under the User environment, the following functions and commands are available:

| | |
|---|---|
| **SPECIES (icon)** | **COLOR** |
| **APPLICATION** | **PWR D** |
| **PRESET** | **DOPPLER** |
| **FREQUENCY** | **PROGRAMMABLE KEY** |
| **DEPTH** | **PROGRAMMABLE KEY** |
| **TGC** | **PROGRAMMABLE KEY** |
| **ADJUST** | **MORE*** |
| **FREEZE** | |
| **IMAGE OR CLIP** | |

*__MORE__ menu for **IMAGE, REVERSE, B UPDATE, M MODE, ZOOM, B+B,** and **L/R.**

## Control Keys in B-Mode on MyLab

Additional settings are present under the **SETTINGS** tab, the following command parameters are listed on the right of the screen:




The command parameters in Real Time 2D are organized in pages (on the right of the screen) that can be scrolled by use of the **SETTINGS** key at the bottom of the list. The following command keys are available:

| | |
|---|---|
| TEI | FOCAL POINTS |
| DENSITY | STEER |
| SIZE | POWER |
| X-VIEW | XVIEW SMOOTH |
| GREY MAP | XVIEW ENHANCE |
| AMBIENT LIGHT | XVIEW DETAIL |
| DYNAMIC RANGE | M-VIEW |
| COLORIZE | TP-VIEW |
| SHARPNESS | ORIENTATION |
| PERSISTENCE | CLIP DURATION |
| | BRIGHTNESS |

## Tips for 2D Scanning with MyLab

### 2D Format Optimization

The **ORIENTION** key can be used to change the sector orientation (normal/upside down), while the **REVERSE** key changes right/left or left/right orientation depending on the application.

- Use the **DEPTH** button to increase or decrease scanning depth.

**To Enlarge 2D Area**


*The greater the zoom level, the smaller the ROI will be.*

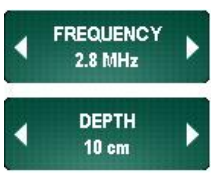
The 2D can be enlarged; the enlargement factor is variable.

- Press **ZOOM** to display the ROI box
- Position the ROI box in the screen area by use of the sliders
- If necessary, the zoom level and therefore the ROI size can be modified.
- Press the **ZOOM** key to activate the selected Zoom zone
- Press **ZOOM** again to return to a normal 2D

### 2D Display Optimization

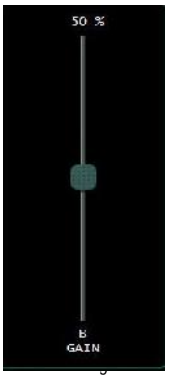
First of all, the gain must be properly adjusted in order to clearly display the structures being examined; then, fine optimizations can be performed interacting with the display commands or with the acoustic parameters of the probe.

### Acoustic Parameters

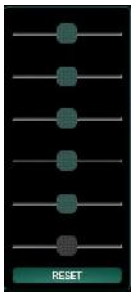



The **FREQUENCY** key allows the imaging frequency to quickly change (higher frequency to optimize resolution, lower frequency to increase penetration).

Use the **DEPTH** command to increase or decrease scanning depth.




The gain can be adjusted within the entire sector by the gain slider that will appear when the area beneath the presets is touched. Slide the button on the bar to the up/down direction to decrease/increase the gain.


*TGC*

To adjust the gain on individual areas of the sector use the **TGC** potentiometers.
The **TGC** potentiometers appear on the screen by touching the same area as for the gain when the **TGC** key is selected. After 5 seconds they are not touched they will disappear from the screen again. Moving the sliders to the left decreases and to the right increases the gain. With the **RESET** button all sliders can be reset in the centre position. The position of the TGC sliders can be saved for each probe under preset: set the TGC sliders position and then press **SAVE** followed by **STORE SETTING.**

In order to fully employ the dynamics of the system, ESAOTE recommends keeping the general gain at a relatively high level.


**TEI** mode can be activated on lower frequency probes by pressing the **TEI** key. This mode generally improves the brightness of the image by decreasing acoustic noise. Because of the non-linear response of tissues to ultrasound energy, TEI may require higher acoustic emissions compared with conventional imaging; the use of this mode is recommended especially for patients with difficult acoustic windows.

> **Note**
>
> Acoustic parameters and gain interact with one another; it may be necessary to review the adjustment of gain when an acoustic parameter changes.


**DENSITY**, available with linear and convex probes, optimizes image quality.


With the **SIZE** key the image sector size can be adapted. This function is available with convex-array probes only.

### View Commands

These commands are mainly "subjective" and patient-dependent.


The **M-VIEW** key is displayed when either a Linear or Convex probe is used. To activate the MView mode, press the corresponding key: the B-Mode image will be the result of different bidimensional images acquired with different steering angles. Different MView values correspond both to different view lines and steering angles.


The **TP-VIEW** key is active when Linear Array probes are used. TP VIEW activates trapezoidal view, enlarging the probe's field of view.


The **X-VIEW** key allows a real-time image enhancement of tissue margins and tissue resolution to increase diagnostic confidence, eliminating speckle and noise artefacts. The available values are 1, 2 and C. X-view values 1 and 2 are fixed presets, while with X-view value C the X-view parameters can be adjusted using **XVIEW SMOOTH, XVIEW ENHANCE** and **XVIEW DETAIL**.


The **GREY MAP** key changes the post-processing map. The gray map can be replaced with one of the twelve chromatic scales to improve contrast, ranging from minimum to maximum contrast.


The **AMBIENT LIGHT** key allows tissue structures to be characterized, reacting to the compression of reflected echoes. Ten different levels can be selected: the lower the selected value, the greater the contrast.


The **DYN RANGE** key changes the dynamic range improving the image contrast


A chrominance scale can be selected using the **COLORIZE** key. The system has various different colorizations.


The **SHARPNESS** key accentuates the edges and the small differences in tissues. Five different levels can be selected.


The **PERSISTENCE** key allows the persistence level applied to the Real Time view to be controlled; increasing persistence levels increases the perception of the image, but decreases the discrimination of moving structures.


The focal point in transmission is positioned according to the initial depth, in order to optimize the entire analysis area. The focal point can be changed to increase the resolution and sensitivity of a specific area of the 2D; it is also possible to activate more than one focus in transmission and to increase resolution over a larger area.

*The frame rate decreases if more than one focal point is active.*

**Note**

Several focuses in transmission can be activated; in this case, the relative distance between focuses is pre-established.

Pressing the **FOCAL POINTS** key will change the number of active focuses. 1 to 4 focal points can be chosen. The Focus Touch Technology gives control over the relocation of the focal points by simply touching the screen at any region of interest on the ultrasound image.


The **STEER** key (active for linear probes only) modifies the slope of the B-Mode image.


The **POWER** key gives the possibility to adjust the acoustic output power between 10 and 100% of the maximum Acoustic Output allowed by the application.

**SS**

*Refer to the òSafety and Standardsó manual for further information.*

The **POWER** control is used to change the transmitted power; use the minimum power compatible with a diagnostic level of the images. If there is insufficient sensitivity, make sure the gain, focal point and probe frequency have been set correctly before increasing the power.


The **BRIGHTNESS** key gives the possibility to adjust the the brightness of the screen.

Chapter 2

# 2 - M-Mode

This chapter lists the software keys available in M-Mode format and explains how to best use the controls available to optimize the image quality.

## Activation of M-Mode Format

- Press **M-MODE** key to activate M-Mode analysis.
- Position the relative B-Mode line with the slider.
- Press **M-MODE** again to activate the M-Mode; the display will split showing the B-Mode and the M-Mode (rapid sequence of the B-Mode).


By pressing the **B UPDATE** key a real time update of the B-Mode image is displayed. Pressing the **M-MODE** key will return to the 2D screen.

## Control Keys in M-Mode on MyLab

There are different command parameters in M-Mode. In the **SETTINGS** tab in M-Mode

In M-Mode the following functions and commands are available:

**X-VIEW**

**GREY MAP**

**AMBIENT LIGHT**

**DYNAMIC RANGE**

**COLORIZE**

**SHARPNESS**

**SWEEP TIME**

**POWER**

## Tips for M-Mode Scanning with MyLab

**M-Mode Display Optimization**

The adjustments for this mode are the same as those for B-Mode. In order to obtain a good M-Mode trace, it is fundamental to optimize the 2D image from which the trace will then be sampled. During the exam the **B UPDATE UPDATE** key freezes the trace acquisition and the reference 2D is temporarily re-activated.. Normally, further interactions are not necessary.

**View commands**

*Refer to B-Mode for further explanation*

The following keys: **X-VIEW**, **GREY MAP**, **AMBIENT LIGHT**, **DYNAMIC RANGE**, **COLORIZE**, **SHARPNESS**, **SWEEP TIME** and **POWER** are similar in function and operation to B-Mode.


The **SWEEP TIME** command can be used to change the sweeping speed of the M-Mode trace.

Chapter 3

# 3 - Doppler

This chapter lists the software keys available in PW Doppler and explains how to use the controls available to optimize image quality.

## Activation of Doppler Format


*Doppler*

- Press **DOPPLER** key to activate the sample volume on the 2D image.
- Position the sample volume with the sliders, by dragging it or by pointing on a preferred spot.
- Press **DOPPLER** key again to activate PW Doppler analysis.
- **IF** necessary, press **SETTINGS** tab to modify PW Doppler parameters.


Pressing the **DOPPLER** key will return to the 2D screen. During the exam the **B UPDATE** key freezes the trace acquisition and the reference 2D is temporarily re-activated. To switch back to the Doppler trace press the key once more.

# Control Keys in Doppler on MyLab

In the **SETTINGS** tab, the Doppler command parameters can be adjusted:

The command parameters in Doppler are organized through pages (on the right of the screen) that can be scrolled by use of the **SETTINGS** key at the bottom of the list.

In Doppler mode, the following functions and commands are available:

| | |
|---|---|
| **PRF DOPPLER** | **GREY MAP** |
| **THETA ANGLE** | **COLORIZE** |
| **STEER** | **AUDIO** |
| **BASELINE** | **SWEEP TIME** |
| **WALL FILTER** | **TRACE TYPE** |
| **SAMPLE SIZE** | **TRACE METHOD** |
| **POWER** | **DYNAMIC RANGE** |
| | **PLEX** |

# Tips for Doppler Scanning with MyLab

### Doppler Format Optimization

*Baseline*

The **BASELINE** key moves the baseline up or down. The BASELINE function of the Doppler frequency spectrum presentation can also be used directly from the USER page. By just touching the Doppler spectrum area the baseline can be set directly to the preferred level.

*Theta Angle*

If the application defaults to the correction-angle, use the **Θ ANGLE** control to align the angle vector with the flow direction. The **STEER** key allows to orient the Doppler line.

*Sweep Time*

The **SWEEP TIME** command can be used to change the scanning speed.

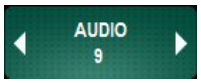
### Doppler Optimization

*Wall Filter*

The gain must first be optimized until a clear envelope of the spectral analysis is obtained; the **WALL FILTER** must be set in order to eliminate wrong low-speed signals caused by moving structures. Interaction with other commands or the acoustic parameters further improves the spectrum quality.

### Gain and Wall Filters

This knob affects the Doppler video and audio components.



*Audio*

**Note**

The Doppler volume can be changed independently by using the **AUDIO** key (under **SETTINGS** tab).

### Display Commands

*Grey Map*

The **GREY MAP** key allows the post-processing map to be changed. The gray map can be replaced using one of the six chromatic scales (**COLORIZE**) to improve contrast.

*Sample Size*

In PW Doppler, the **SAMPLE SIZE** key allows the sizes of the sample volume to be changed.

### Acoustic Parameters

The **FREQUENCY** key allows the **Doppler frequency** to be changed: lower frequency increases penetration.

SS

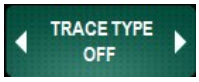
*Refer to the "Safety and Standards" manual for further information.*

**The POWER control is used to change transmitted power; use the minimum power compatible with a diagnostic level of the images. If there is insufficient sensitivity, the user should ensure that the gain, focus and probe frequencies have been set correctly before increasing the power.**

*PRF Doppler*

The **PRF** key activates the Doppler PRF, allowing to increase the available maximum PRF value to measure higher velocities by using more sample volumes.

### Real time Doppler measurements



*Trace Type*

**TRACE TYPE** enables the calculations of parameters during real time PW trace. It also defines how the trace is followed, by Maximum values, mean values or both.

*Trace Method*

**TRACE METHOD** defines the part of the spectrum that has to be traced for real-time measurements calculation. It is possible to trace the full spectrum, or just the positive or the negative part.

**CAUTION**

**Automatic Doppler measurements represent just an immediate method to get a general idea of the importance of the pathology under examination. For a precise pathology evaluation we recommended to use the application calculation package. - For a correct diagnostic evaluation, it is recommended to use the angle correction factor, in order to obtain the right flow alignment. Make sure that the profile of the automatically detected Doppler flow (yellow line) corresponds to the real profile.**

The **DYNAMIC RANGE** key changes the dynamic range improving the image contrast.


The **PLEX** key updates or freezes the reference 2D image, keeping the trace in real time.

Chapter 4

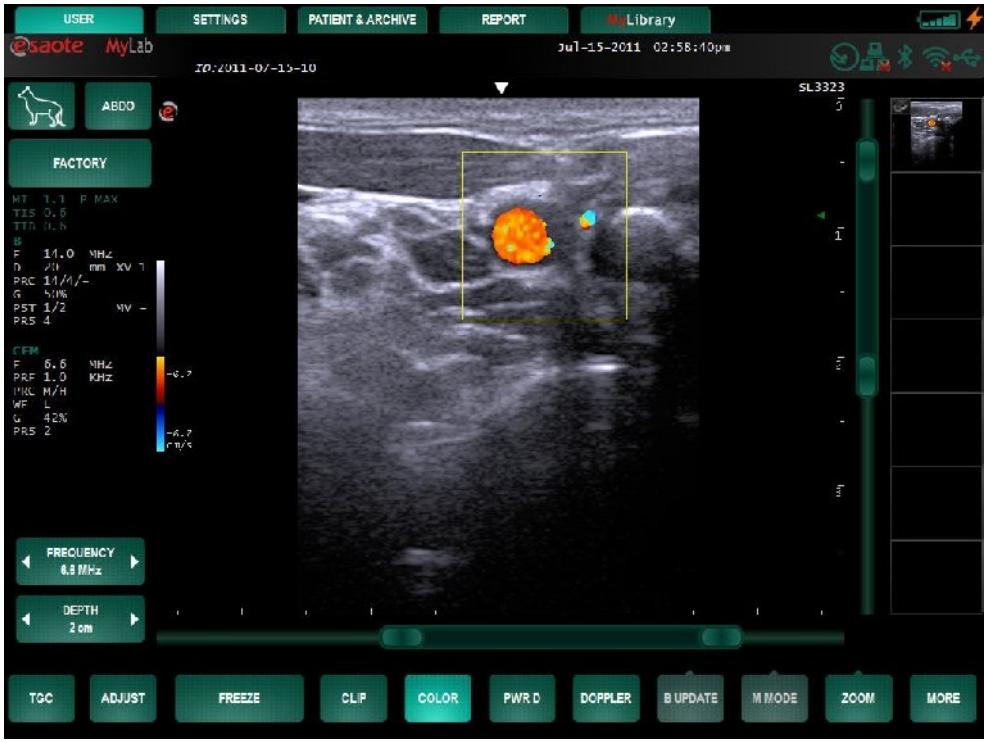
# 4 - Color Flow Mapping (CFM) and Power Doppler (PWR D)

This chapter lists the software keys available in CFM and explains how they are used to optimize the image.

## Activation of Color Flow Mapping Format

*Color*

- Press **COLOR**.
- Use the sliders to move and change the area of the color box. or change the position by dragging.




Pressing the **COLOR** key will return to the 2D screen.

# Control Keys in CFM on MyLab

In the **SETTINGS** tab the command parameters for Real Time Color Flow Mapping mode can be adjusted:

he command parameters in Real Time Color Flow Mapping are organized through pages (on the right of the screen) that can be scrolled by use of the **SETTINGS** key at the bottom of the list.

The following command keys are available:

| | |
|---|---|
| **PRF COLOR** | **MAS THRESHOLD** |
| **SMOOTH** | **COLORMAP** |
| **STEER** | **C CORRELATION** |
| **BASELINE** | **AXIAL INTEGRATION** |
| **WALL FILTER** | **POWER** |
| **PERSISTENCE** | **ORIENTATION** |
| **SENSITIVITY** | |

**WARNING**

**When the steering is set to the maximum step, color dots could be displayed because of artefacts. Should this happen, reduce the steering by one step.**

# Tips for Color Flow Mapping Scanning with MyLab


*Baseline*

### Optimization of the Color Flow Mapping Format

The **BASELINE** key is used to move the zero line up or down. The **STEER** key allows changing the steering of the color box.

**WARNING**

**When the steering is set to maximum step, color dots could be displayed (artifacts). Should this happen, reduce the steering by one step.**

The width of the ROI CFM and the B-Mode angle must be as small as possible in order to maximize the CFM frame rate.

**Note**

The B-Mode angle (**SIZE** key) can be reduced to maximize the frame rate and to enlarge the analysis area using the **ZOOM** key.

### Display Optimization

First of all the operator must adjust the gain, to optimize the display of the analysis area. The commands and the acoustic parameters controls allow then to further refine the signal.

### Gain

The user is recommended to adjust the gain to obtain the most useful signal level.

**Note**

Color mode gain must be properly adjusted in order to obtain a good CFM signal; excessive gain may "mask" the flow.


*Color Map*

### View Commands

The **COLOR MAP** key allows a different CFM map to be selected: ten different color maps are available.

The **PRF** and **DENSITY** keys affect Color "filling".

| Control | CFM filling |
|---|---|
| PRF ⇧ | ⇩ |
| PRF ⇩ | ⇧ |
| DENSITY ⇧ | ⇧ |
| DENSITY ⇩ | ⇩ |

*Maximum PRF is proportional to the B-Mode depth*


Color sensitivity can be adjusted using the **SENSITIVITY** control. Three levels are available (Low, Medium and High). Flow continuity increases with high persistence levels and reduce the system's frame rate; the **PERSISTENCE** option optimizes this parameter. **WALL FILTER** can be used to reduce the artefacts caused by acoustic decoupling or moving structures. The **SMOOTH** key makes the flow representation homogenous.

### Acoustic Parameters

Only one focal point is active in transmission in CFM, despite the B-Mode settings and is automatically positioned at the centre of the ROI CFM. The CFM frequency can be changed using the **FREQUENCY** key; the higher frequency helps to show low speeds. With the **POWER** key the acoustic ouput can be adjusted.

*SS*

*Refer to the "Safety and Standards" manual for further information.*

**The POWER control is used to change transmitted power; use the minimum power compatible with a diagnostic level of the images. If there is insufficient sensitivity, the user should ensure that the gain, focus and probe frequencies have been set correctly before increasing the power.**

Chapter 5

# 5 - Freeze

This chapter lists the software keys available in freeze and explains how to use the keys.

## Control Panel Keys in Freeze on MyLab

Pressing the **FREEZE** key freezes the image and displays the following screen:


Functions available when Freeze mode is active are: **MARK**, **CALIPER**, **IMAGE**, **CLIP**, **PRINT**, **ANNOT**, **ZOOM** and **CINE**. In certain applications, where dedicated measurements are available, the key **MEASURE** is also available.

*Memory scrolling cursor*

After freezing the image, the system displays the memory-scrolling bar, where the images acquired immediately prior to putting the system into freeze mode are temporarily saved and can be recalled on screen.

# Use of the Control Panel Keys with MyLab

*Begin/End Key*

The **BEGIN**/**END** key is used to automatically position the user at the start or end of the sequence.

Moving the bar scrolls through the images acquired before activating the freeze mode.

*Stop and Play Keys*

When the **PLAY** mode is active, the sequence of stored images is reviewed kinetically. The **STOP** key stops play mode and keeps the latest played image on the screen.

Chapter 6

# 6 - Body Marks

This chapter explains how body marks are organized and how to use them.

## Body Marks

Body marks are schematic drawings of anatomical sections. A vector overlays the mark to indicate the probe's position. The active body mark is displayed at the bottom left of the screen.

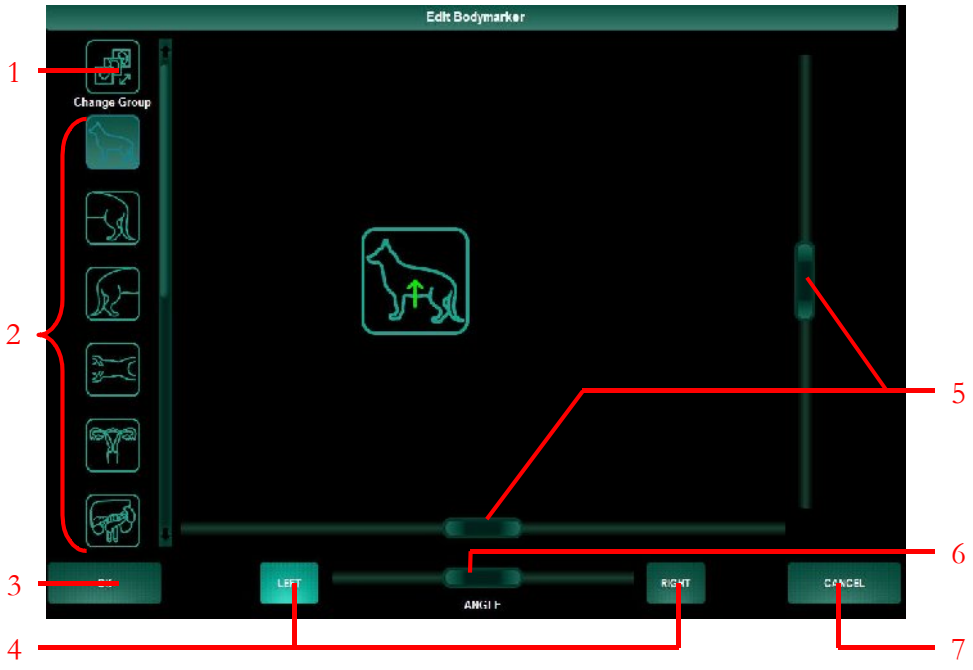
Body marks are organized in groups: each species and application has its specific set of body marks.

## Body Marks Activation

The **MARK** key allows adding a bodymark to the current image. When selecting the **MARK** key a pattern list opens on the left of the screen with the bodymarks available for the current application. Body marks can be activated and displayed in **FREEZE** mode.

### Control Panel Keys

The following figure gives an overview of the options:



| Number | Icon |
|---|---|
| 1 | Change group of bodymarks |
| 2 | Select bodymark |
| 3 | Confirm bodymark |
| 4 | Define left and right bodymark for B+B mode in all other modes, only the left is shown. |
| 5 | Position arrow on bodymark |
| 6 | Change angle of arrow on bodymark |
| 7 | Cancel bodymark |

The body marks list is display on the left of the screen and can be scrolled to review all the body marks available.


*Change Group*

To choose a different group of marks, use the **CHANGE GROUP** key. Beneath the icon available groups will be listed. Select the preferred group.

Use the sliders for positioning the arrow in the horizontal and vertical direction and adjust the angle of the arrow. The arrow can also be positioned by touching the wanted position within the bodymark

The user can alter the orientation of the image by choosing the **LEFT** or **RIGHT** key, which will alter the color of the arrow respectively into green of yellow.

Once the icon has been selected and the arrow positioned, press the **OK** key to confirm the body mark and arrow position on screen.


*Mark Off*

Select the **MARK OFF** key or press **CANCEL** to exit without displaying any body mark.

## Species and Application Body Marks

**Bovine**

**Ovary Application**


*Bovine*


*General*


*Bovine uterus*

**Canine**

**Abdominal Application**


*Canine*


*General*


*Left*


*Right*


*Back*


*Uterus Ovaries*


*Stomach*


*Liver*


*Kidney*


*All*


*Pancreas*


*Gallbladder*

**Canine**
**Cardio Application**


*Heart general*


*Short axis*


*Short axis PV*


*5 chamber view*


*4 chamber view*


*Long axis*


*Short axis MV*


*Short axis AV*


*2 chamber view*


*Aorta*

**Canine**
**Repro Application**


*General*


*Right*


*Left*


*Back*

*Uterus Ovaries*

**Equine**
**Abdominal Application**

*Equine*

*General*

*Stomach*

*Liver*

*Kidney*

*Head*

*Pancreas*

*Gallbladder*

*All*

**Equine**
**Cardio Application**

*Heart general*

*Short axis*

*Short axis PV*

*5 chamber view*

*4 chamber view*

*Long axis*

*Short axis MV*

*Short axis AV*

*2 chamber view*

*Aorta*

**Equine**
**Ovary and Repro Application**


*General*


*Uterus Ovaries*

**Equine**
**Tendon Application**


*General*


*Front limb*


*Hind limb*

**Feline**
**Abdominal Application**


*Feline*


*General*


*Left*


*Right*


*Back*


*Uterus Ovaries*


*All*


*Stomach*


*Pancreas*


*Liver*


*Gallbladder*


*Kidney*

**Feline**
**Repro Application**


*General*


*Right*


*Uterus Ovaries*


*Left*


*Back*

**Animal Farm**
**Repro Application**

**Swine**
**Repro Application**


*Uterus Ovaries*

**Ovine and Llamas**
**Repro Applications**


*Uterus Ovaries*

Chapter 7

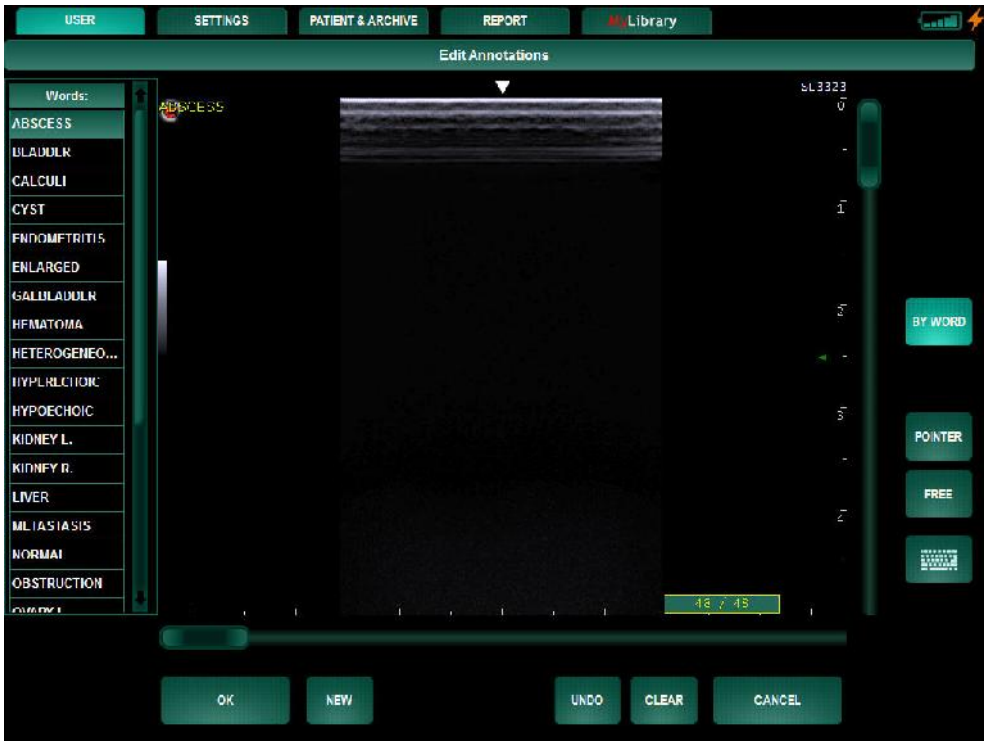
# 7 - Annotations

This chapter explains how to use the free text annotation function and how to activate and use the glossary available in the annotation session.

## Annotations on MyLab


When the **FREEZE** key is pressed during the exam, the **ANNOT** key will show up. The **ANNOT** key allows the user to work with a configurable glossary:

Below is the screen in annotation mode.




In annotation mode the word keys are displayed on the left of the screen. The key **BY WORD** respectively activates the by word glossary associated to the application. The term keys (**E1**, **E2**, **E3** and **E4**) are displayed at the bottom of the list when the glossary by sentence is active. Each **TERM** key contains a specific glossary, with which a sentence can be made.

The text home position and Annotation mode can be changed in the Annotation Setup menu (**MENU** – **MISCELLANEOUS** – **ANNOTATION SETUP**).

The words can be repositioned in any direction with the touch screen, preferably with the stylus.

**Glossary by Word**

On the left of the image the system displays the list of the available words. To select a word follow this procedure:

**Procedure**

- Scroll the list through and select the desired word (highlighted in blue).
- The selected word will be displayed on screen in yellow. The word can be placed on the screen by the sliders or by pressing the position on the screen where the word is desired.
- Press **OK** to confirm the selected word and close the annotation environment or press **NEW** to confirm the word and add a new annotation word on the screen.

Use the **KEYBOARD** key to activate the text entry. The keyboard will appear and it is possible to modify a selected word on the screen or edit a new word not included in the list. Pressing **ENTER** confirms the editing and closes the keyboard.

The **POINTER** key gives the possibility to add an annotation in the form of a pointer. This pointer can be an arrow or a circle. Select the region of interest on the touchscreen to place the pointer.

Use the **KEYBOARD** key to activate the text entry with the selected word in the text entry field; use the **FREE** key to enter text in an empty text entry field.

The **CLEAR** key cancels the text without exiting while the **CANCEL** key closes the annotation environment without confirmation.

The **UNDO** key cancels the last operation.

Pressing the **OK** key confirms and closes the annotation session.

According to the annotation setup, the text on the screen can be removed or remain visible when turning to live mode.

The **CLEAR** key deletes all the text on screen while the **CANCEL** key closes the annotation session without confirmation. If the "Hide with live image" field in the "**MENU**, **MISCELLANEOUS**, **ANNOTATION SETUP** and **GENERIC**" option (**SETTINGS** key) is activated, the text is automatically erased as soon as real time is resumed.

The **UNDO** key deletes the last entered word / sentence or action.

**Glossary by Sentence**

On the screen the system displays the sentence that the system automatically composes using the first words of the term lists. The list of the available words for

the first term of the sentence is displayed on the left of the image. The four terms composing the sentence are displayed on the bottom of the list, one key for each term: press the keys to select the desired term.

**Procedure**

- Scroll the lists using the **TERM** keys and select the desired words (highlighted in blue). The sentence will be displayed in yellow on the screen and, selecting different words through the terms, the sentence will be automatically updated.
- Press a point on the screen or use the sliders to change the position of the sentence.
- Pressing **NEW** confirms the last sentence and starts a new one.
- Pressing **OK** closes the annotation environment with confirmation.
- The sentence can be modified or completely edited by the **KEYBOARD** key that activates text editing.
- Press **ENTER** to close the keyboard and confirm.

Use the **KEYBOARD** key to activate the text entry with the selected word in the text entry field; use the **FREE** key to enter text in an empty text entry field.

The **CLEAR** key deletes all the text on screen while the **CANCEL** key closes the annotation session without confirmation. If the "Hide with live image" field in the "**MENU**, **MISCELLANEOUS**, **ANNOTATION SETUP** and **GENERIC**" option (**SETTINGS** tab) is activated, the text is automatically erased as soon as real time is resumed.

The **UNDO** key deletes the last entered word / sentence or action.

Chapter 8

# 8 - User Presets

This chapter lists and explains the menu available for creating and saving presets in **MyLab**.

## User Presets Menu on MyLab


The preset selection is made by the preset button positioned on top left of the screen, under the Species and Application buttons.

The system permits to adjust parameters in different modes and save those configurations under user-defined presets.


## Create a Preset on MyLab

This procedure enables the creation of a preset on **MyLab**.

Pressing the **SETTINGS** tab displays the parameters available in the active operation mode.

The user can modify the parameters and save the preferred settings by pressing the **SAVE** key.

Pressing the **SAVE** key opens a menu for preset management on the right side of the screen.

- The **STORE SETTING** key will save the parameters configuration in the current preset.
- The **MAKE STARTUP** key defaults the current preset to be active as the system starts up.
- The **LOAD FACTORY** key reloads the factory presets erasing the eventual customizations made previously on the presets.
- The **RENAME SETTINGS** key will enable the changing of names of the presets


With the **LOAD FROM SETTING** key, the user can choose to copy the parameters from a preset (selected by the user in the preset list) into the current preset.

When the **LOAD FROM SETTING** key is pressed, the Copy Preset menu appears on the left side of the screen. The user can then select the preset whose settings have to imported and copied into the current one.

To exit the procedure without performing any selection press the **CANCEL** key.

## Preset Import/Export on MyLab

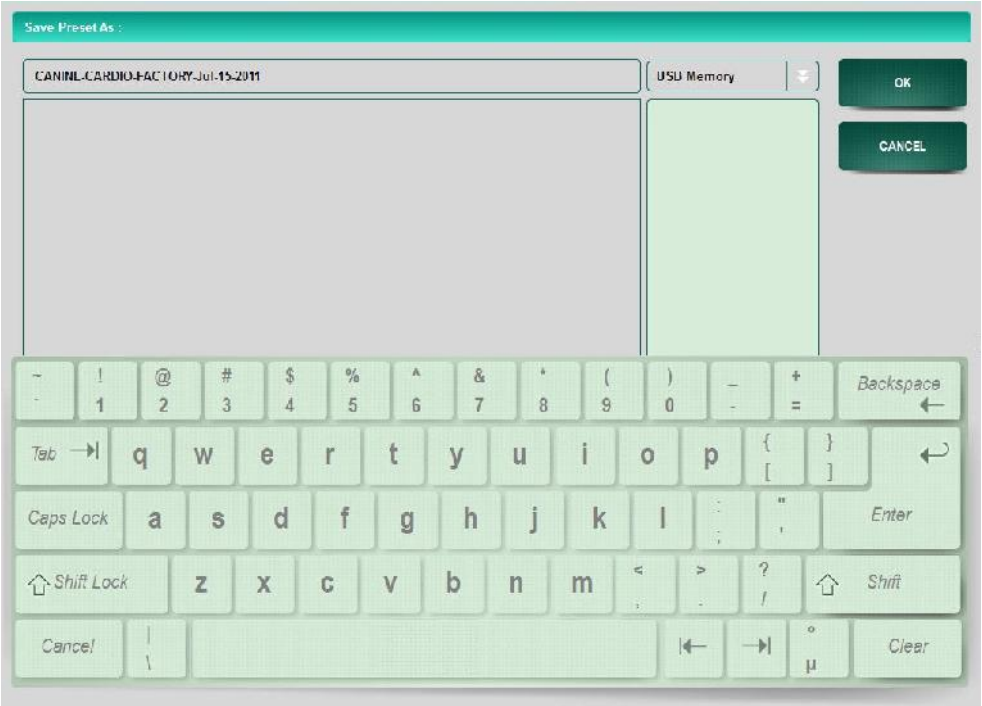
Presets can be imported/exported on/from **MyLab** units through USB memory media.

**Procedure to save presets to USB**

Presets can be saved to a USB medium by the following procedure:

- Connect a USB memory medium to the system.
- Press the **SAVE TO USB** key (or the **SAVE ALL TO USB** key to save all current presets at once).
- The system displays the list of the presets in the system. When preferred, the user can change the name of the preset by keyboard. The keyboard appears when touching the field of the name.
- Press the **OK** key to finalize the procedure.

The following screen will be visible when pressing the **SAVE TO USB** key:



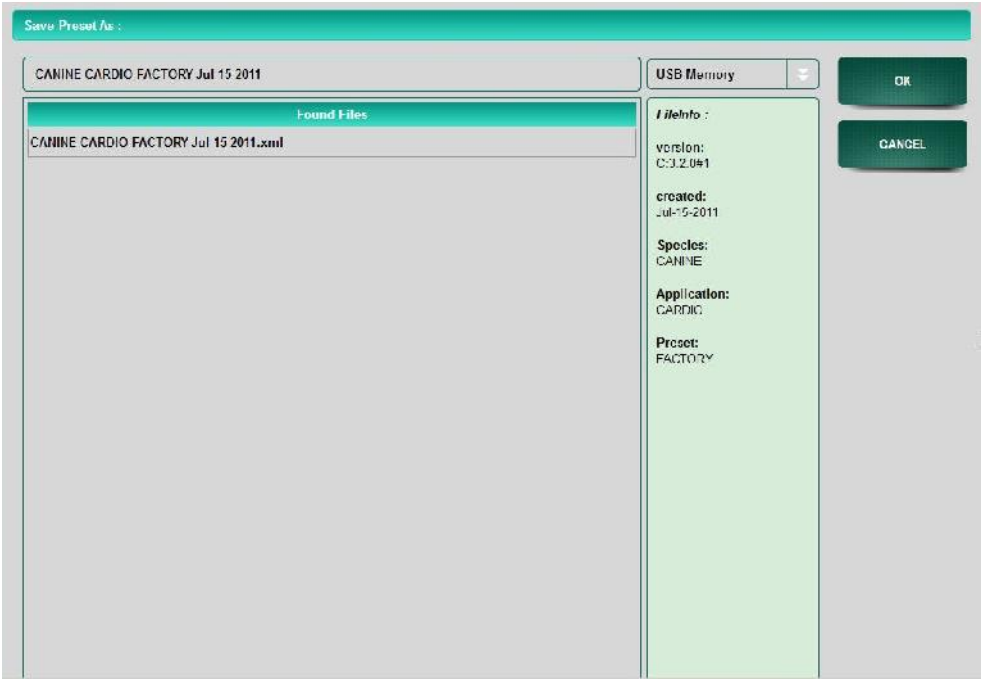

**Procedure to load presets from USB**

Presets can be loaded from a USB memory medium by the following procedure:

- Connect a USB medium to the system.
- Press the **LOAD FROM USB** key (or the **LOAD ALL FROM USB** key to load all presets at once).
- The system displays a list of the presets already saved on a USB medium.
- Highlight the preset to be loaded (information about the file will be visible on the right side of the window) and press **OK** to load the preset.

Repeat the operation for all the desired presets to be loaded.

The following screen will be visible when pressing the **LOAD FROM USB** key:




CAUTION

**Presets can only be saved to USB when the presets are stored first. First, press the STORE SETTING key to save the presets prior to using the SAVE TO USB key command.**

The **CLOSE** key exits the menu without saving any modifications and returns to the Preset menu.

**Note**

The system allows saving presets with the same name: Check therefore that the assigned name is not already available in the list.

## Preset Parameters

Different parameters can be set for each mode, by activating the **SETTINGS** tab.

The following tables list the value or initial status of parameters that can be set mode by mode.

**B-Mode**

| Field | Action |
|---|---|
| **XVIEW** | Sets the initial value of the XView algorithm. |
| **GREY MAP** | Sets the grey scale active in 2D. |
| **AMBIENT LIGHT** | Sets the ambient light settings |
| **DYN RANGE** | Sets the dynamic range. |
| **COLORIZE** | Sets the chromatic scale active in 2D. |
| **SHARPNESS** | Sets the image's sharpness value (low, average, high). |

| Field | Action |
|---|---|
| **PERSISTENCE** | Sets the persistence level. |
| **FOCAL POINTS** | Number of focuses active in transmission. |
| **STEER** | Number of angels for the steering (Linear probes). |
| **POWER** | Sets the acoustic output power. |
| **XVIEW SMOOTH** | Finetuning of **XView** algorithm (only available when **XVIEW** is set to c). |
| **XVIEW ENHANCE** | Finetuning of **XView** algorithm (only available when **XVIEW** is set to c). |
| **XVIEW DETAIL** | Finetuning of **XView** algorithm (only available when **XVIEW** is set to c). |
| **M VIEW** | Sets the initial value of the Mview mode. Different Mview values correspond both to different view lines and steering angles. |
| **TP VIEW** | TP View sets the status (active/inactive) of the trapezoidal view on linear probes. |
| **ORIENTATION** | Image orientation (up/down). |
| **CLIPS DURATION** | Sets the length of clips for live procedures. Clip duration can be to: 1 s, 3 s, 5 s, 10 s, 20 s or 30 seconds. |

**COLOR / PWR D**

| Field | Action |
|---|---|
| **PRF COLOR** | Sets the PRF. |
| **SMOOTH** | Sets the smooth level. |
| **STEER** | Number of angels for the steering (Linear probes). |
| **BASELINE** | Sets the position of the Baseline. |
| **WALL FITLER** | Sets the wall filter value. |
| **PERSISTENCE** | Sets the Persistence level. |
| **SENSITIVITY** | Sets the sensitivity level. |
| **MAS THRESHOLD** | Moving artefact suppression (movement of transducer, breathing of patient, etc.) |
| **COLORMAP** | Sets the colors of the colorscale (maps Doppler frequency to color) |
| **C CORRELATION** | Averaging length of the color correlation |
| **AXIAL INTEGRATION** | Averaging in depth over color pixels |
| **POWER** | Sets the acoustic output power. |
| **ORIENTATION** | Image orientation (up/down). |

**M-Mode**

**Doppler**

| Field | Action |
|---|---|
| **PRF DOPPLER** | Sets the PRF. |
| **THETA ANGLE** | Sets whether the angle correction factor is oriented with a freely configurable angle correction factor. |
| **STEER** | Number of angels for the steering (Linear probes). |
| **POWER** | Sets the acoustic output power. |
| **WALL FILTER** | Sets the wall filter value in Pulsed Wave Doppler. |
| **SAMPLE SIZE** | Sets the default value of the sample volume. |
| **SWEEP TIME** | Sets the sweeping speed of the M-Mode spectrum |
| **GREY MAP** | Sets the scale of the greys active in M-Mode. |
| **COLORIZE** | Sets the chromatic scale active in M-Mode. |
| **AUDIO** | Sets the initial sound value. |
| **BASELINE** | Sets the position of the Base Line. |
| **TRACE TYPE** | Sets the method for Automatic Doppler Measurements (ADM) |
| **TRACE METHOD** | Sets the trace direction for ADM |
| **DYNAMIC RANGE** | Sets the dynamic range. |
| **PLEX** | Updates or freezes the reference 2D image, keeping the trace in real time. |

### Setting Other Parameters

The initial values of the parameters listed in the following table can be set for each application.

| Field | Action |
|---|---|
| **DEPTH (cm)** | Sector (image) depth. |
| **SIZE** | Image sector angle (for convex probes) |
| **FREQUENCY (MHz)** | Imaging, CFM or Doppler frequency or TEI mode. |
| **REVERSE** | Sector orientation (right/left). |
| **DENSITY** | Image density (High/ Low) |

### Imaging Frequency

If available, the TEI (Tissue Enhancement Imaging) mode can also be selected.

### Setting the Gains

For each mode (Imaging, CFM, Doppler) the initial gain value can be set.

## Reset Preset on MyLab

Use the **LOAD FACTORY** key to set the factory presets with their default parameters.

# CALCULATIONS SECTION

This section explains how to use the calculations packages offered by **MyLab**. The section is organized as follows:

- Chapter 1: General Information and Generic Measurements

  This chapter provides general information about the proper manner in which to take a measurement and lists the generic measurements available in each application.

- Chapter 2: Cardiology Calculations

  This chapter lists all the measurements, formulas and accuracies available in the Cardiac calculations packages.

- Chapter 3: Abdominal Measurement Package

  This chapter lists measurements included in the Abdominal measurement package.

- Chapter 4: Equine Tendon Package

  This chapter lists measurements included in the Equine Tendon package.

- Chapter 5: Reproductive Calculation Packages

  This chapter lists measurements and formulas available in the reproductive packages.

- Chapter 6: Animal Science Calculation Packages

  This chapter lists measurements and formulas available in the animal science packages.

- Chapter 7: Measurements Accuracy

  This chapter provides the accuracy of measurements taken with **MyLab**.

# Table of Contents

Chapter 1

# 1 - General Information and Generic Measurements

*Refer to "Getting Started" manual for applications available on* ***MyLab*** *model.*

This chapter provides general information about performing measurements with **MyLab**.

This chapter also lists the generic measurements available in the applications and how to use them. Generic measurements enable the user to quickly take measurements such as distance, area, volume and angle.

## General Information

Measurements can be taken on frozen, stored and archived images. The available measurements are displayed at the right of the image. Messages displayed on the screen provide information guiding the operator in the procedure for making the measurement. The results are displayed on the left of the image.

Clips are compressed for digital storage. Compressed files involve a minimal loss of information (see specifications). Image features, if compared to the original, may not be optimal for the reporting functions.

**To select the views and the positioning of the cursors, Esaote urges the operator to act according to current medical practice and to the instructions of specialists in this subject.**

**Note**

Always enlarge the format to maximize the structure/signal to be measured.

The system cannot be used to measure images with ambiguous calibrations. An error message is shown on such images when the measurement is made.

CAUTION

If measurements are taken in dual mode (B+B) make sure that the images are aligned before taking measurements.

## Diagnosis Based on Measurements

**MyLab** calculation packages have to be used by qualified personnel as a diagnostic tool. The diagnosis doe not have to be based on the measurements only, but these are to be integrated with other clinical data.

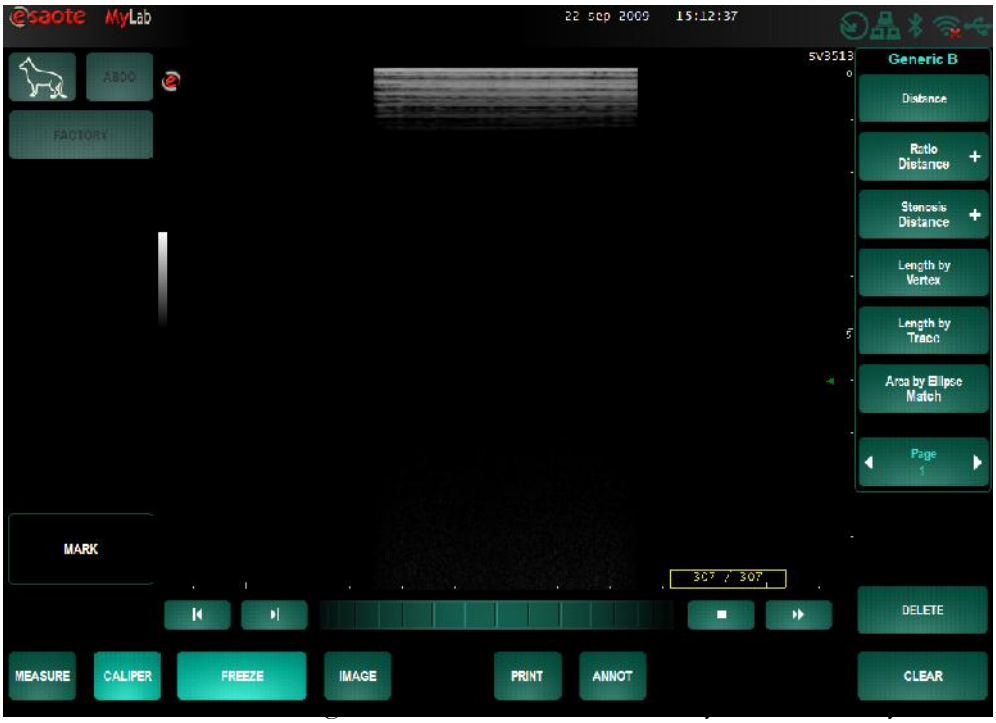
All formulas of **MyLab** advanced calculation packages refer to a number of clinical bibliographic references that are listed for each application in the corresponding chapters of this section. Users are kindly encouraged to consult the original references to draw their conclusions on clinical consistency of the measurements.

> **Note**
>
> The user is responsible for customizations on measurements and calculations.

## Activating Generic Measurements


When in freeze mode, the **CALIPER** key activates the generic measurements menu. The system displays the list of available measurements on the right of the screen, which are automatically identified according to the active mode and application.

The following screen will be available when Generic Measurements are enabled:




bottom of the list.

Some measurements include sub parameters (identified by the symbol +). To display the measurements included in a group, press the symbol and the measurements will be visible.

The user can modify the list of measurements (displayed when the **CALIPER** key is pressed) by accessing the **SYSTEM SETUP** – **GENERIC MEASUREMENTS** in the **MENU**.

## How to Take Measurements

The **CALIPER** key is used to quickly select the measurement required. The measurement highlighted is then operative.

Following the instructions on the screen, position the touch screen stylus and press on the screen to confirm the position. The measurement cross is displayed just above the point pressed on the screen, in this way the measurement cross is always visible, hence it can be positioned more accurately.

The **UNDO** key can be used to re-start a measurement before it has been confirmed. This key is also used to erase a dotted line, point by point.

Some measurements (Length by vertex for example) require the **FINISH** key to end and confirm the measurement.

The **DELETE** key deletes a selected measurement.

The **ADD TO REPORT** key adds the generic measurement to the report.

To move a measurement, select it with the stylus. A box will appear around the measurement point, select any point within de box and then drag the measurement point to a preferred position.

The value being measured is displayed in real time on the left of the image.

**How to Select a Measurement**

- Freeze the image and press **CALIPER**.
- Select the required measurement of a group by pressing the key or using the touch screen stylus (the selected group is displayed on top of the list).
- To follow the entire measurement procedure, press the selected group.

To measure a specific parameter from a measurement group, press the + symbol to expand, and then select the required item.

**Selective Clearing of a Measurement**

- Position the stylus on the measurement to be cleared (the measurement is displayed in white).
- Press the **DELETE** key to clear the selected measurement.

The **CLEAR** key cancels all the measurements and the values displayed in the measurements field from the screen.

### Flow Measurements

A flow measurement is structured into two stages.

**Performing a Measurement**

- Acquire a Doppler trace and press **FREEZE**.
- Press **CALIPER** to activate the calculations menu.
- Select the desired flow measure.
- Follow the instructions displayed on the screen to trace the velocity profile.

## Generic Measurements

The tables below list the measurements available in each mode.

**2D Measurements**

| Parameter | Calculation | Measurement | Displayed results |
|---|---|---|---|
| Distance | Distance | Distance | Distance |
| Distance Ratio | Distance ratio | Two distances | Two distances, Distance1/Distance2 |
| % Diam | Diameter reduction | Two distances | Two distances, Δ Distance/Distance1 |
| Vx-Length | Length (approximately straight) | More distances | Global distance |
| Tr-Length | Length (Profile) | Distance | Distance |
| A-Area | Area (Ellipse) | Distance, Area | Area, Perimeter |
| Vx—Area | Area (approximately straight) | More distances | Area, Perimeter |
| Tr-Area | Area (Profile) | Profile | Area, Perimeter |
| A-Ratio | Areas ratio | Two | Two areas, Area1/Area2 |
| % Area | Reduction area | Due areas (on Profile) | Two areas, Δ Aree/Area1 |
| El-Volume | Volume (Ellipse) | Distance, Area | Area, Volume |
| Tr-Volume | Volume (Profile) | Profile, Distance | Area, Distance, Volume |
| Bi-Volume | Volume (Axes) | Three distances | Three distances, Volume |
| Angle | Angle | Angle | α/β angle |

**TAM Measurements (M-Mode and Doppler)**

| Parameter | Calculation | Measurement | Displayed results |
|---|---|---|---|
| Distance | Distance | Distance | Distance |
| D-Ratio | Distance ratio | Two distances | Two distances, Distance1/Distance2 |
| Time | Time | Time | Time |
| % Time | Time ratio | Two Times | Two times, Time1/Time2 |
| HR | Heart rate | Distance | R-R Interval, Heart rate |
| Velocity | Velocity | Velocity | Distance, Time, Velocity |
| % Veloc | Velocity ratio | Two velocities | Two velocities, Velocity1/Velocity2 |
| FVI | Vascular FVI | Spectral envelope | FVI, Minimum, mean and maximum velocity |
| SVel/DVel | Systolic and Diastolic Velocities ratio | Two velocities | Systolic velocity, Diastolic velocity, Systolic velocity/Diastolic velocity |
| RI | Resistive index | Two velocities | Two velocities, Resistive index |
| Slope | Slope | Distance | Acceleration, PHT |

Chapter 2

# 2- Cardiac Calculations


*Canine*


*Feline*


*Equine*

*Cardiac application icon*

This chapter describes the Cardiac application package (measurements and report environments) and lists the available measurements.

The Cardiac application package applies for the following species: canine, feline equine.

**Cardio**


**Note**

This application calculation package is only available when the corresponding license is activated. Please refer to the System Configuration manual for all the options/licenses of the **MyLab** and their status.

## Cardiac Application

The Cardiac application can be activated selecting the **CARDIO** key from the application list. When the Cardiac application is selected, in freeze mode, press the **MEASURE** key to activate the cardiac measurements.

## Cardiac Measurements

### B-Mode Measurements

Pressing the **MEASURE** button on the keyboard of the system in B Mode makes the list of the cardiac measurements appear on the right side of the screen.

The measurements are listed below:

## Ejection Fraction (Simpson-Biplane)

**EF (SIMP SI-B)**

The Simpson method requires that measurements be taken on two cardiac views(Apical four chambers, A4C; Apical two chambers, A2C). The parameters that can be measured are:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| 4CAd | 4C Diastolic area | 4CAd | Profile, Distance |
| 4CAs | 4C Sysytolic area | 4CAs | Profile, Distance |
| 2CAd | 2C Diastolic area | 2CAd | Profile, Distance |
| 2CAs | 2C Systolic area | 2CAs | Profile, Distance |

Since the Simpson method requires measurements on two different cardiac views, it is recommended that you use a Dual 2D so that both views are available. The group parameters are measured in four phases.

**Performing the Measurements**

- Acquire a B-Mode image and press **FREEZE**.
- If necessary, scroll memories to select the end-diastolic A4C image and press **MEASURE** to activate the menu.
- Select the "EF (Simpson)" group
- Follow the instructions on the screen to trace the diastolic profile and the LV long axis.
- Press the touchscreen to select the end-systolic image in A4C
- Follow the instructions on the screen to complete the measurements.
- Repeat the phases in A2C.

If an A2C image has not been stored, it is possible to return to Real Time with **B-MODE** to complete the acquisition. Freeze the image and press **MEASURE** to complete the measurement.

These parameters are automatically calculated once the measurements have been taken:

| Parameter | |
|---|---|
| LVVd | LV diastolic volume |
| LVVs | LV systolic volume |
| EF | Ejection fraction |
| SV | Stroke volume |
| SI | Stroke index |
| HR | Heart rate |
| CO | Cardiac output |
| CI | Cardiac index |

LV: Left ventricle

## Ejection Fraction (Area-Length)

**EF (A-L)**

The ejection fraction measurement taken using the Area-Length method requires the measurement of diastolic and systolic parameters. The images must be from the same cardiac cycle. The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| DIA AREA | LV diastolic area | LVAd | Profile |
| DIA AXISl | LV diastolic axis | LVLd | Distance |
| SYS AREA | LV systolic area | LVAs | Profile |
| SYS AXISl | LV systolic axis | LVLs | Distance |

LV: Left ventricle

Ejection Fraction can be calculated on a single-frame 2D or on a Dual 2D image. The Dual 2D (particularly in simultaneous mode) is recommended. The group parameters are measured in two phases.

**Performing the measurements**

- Acquire a cardiac cycle and press **FREEZE**.
- If necessary, scroll memories to select the tele-diastolic image and press **MEASURE** to activate the menu.
- Select the "EF (Area-Length)" group
- Follow the instructions on the screen to trace the diastolic profile and the Ls long axis.
- Select the tele-systolic image and follow the instructions on the screen to complete the measurements.

If an entire cardiac cycle has not been stored, it is possible to return to Real Time with **B-MODE** to complete the acquisition. Freeze the image and press **MEASURE** to complete the measurement.

The following parameters are automatically calculated once the measurements have been taken:

| Parameter | |
|---|---|
| LVVd | LV diastolic volume |
| LVVs | LV systolic volume |
| EF | Ejection fraction |
| SV | Stroke volume |
| SI | Stroke Index |
| HR | Heart rate |
| CO | Cardiac output |
| CI | Cardiac Index |

LV: Left ventricle

## Fractional Area Change (FAC)

**FAC**

The images must be from the same cardiac cycle. The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| DIA AREA | LV diastolic area | LVAd | Profile |
| SYS AREA | LV systolic area | LVAs | Profile |

LV: Left ventricle

Fractional Shortening can be measured on a single-frame or on a Dual 2D format, the latter display (in simultaneous mode) is recommended to display side-by-side a systolic and diastolic frame of the same cardiac cycle. The group parameters are measured in two phases.

**Performing the Measurements**

- Acquire a cardiac cycle and press **FREEZE**.
- If necessary, scroll memories to select the tele-diastolic image and press **MEASURE** to activate the menu.
- Select the "FAC" group and go to one of the calculations.
- Follow the instructions on the screen to trace the diastolic profile and the Ls long axis.
- Use the trackball to select the tele-systolic image and press **MEASURE**.
- Follow the instructions on the screen to complete the measurements.

If an entire cardiac cycle has not been stored, it is possible to return to Real Time with **B-MODE** to complete the acquisition. Freeze the image and press **MEASURE** to complete the measurement.

Fractional area change (FAC) is automatically obtained once the measurements have been taken:

## Left Ventricle

**LV**

This measurement requires an entire cardiac cycle be acquired. The group includes the following:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| IVS dia | Intraventricular septum - Diastole | IVSd | Distance |
| LVD dia | LV diameter - Diastole | LVDd | Distance |
| PW dia | Postirior wall -Diastole | PW | Distance |
| LVD sys | LV Diameter-Systole | LVDs | Distance |

LV: Left ventricle

The following parameter is automatically calculated once the measurements have been taken:

| Parameter | |
|---|---|
| FS | Fractional shortening |

**Note***

The ejection fraction is calculated using the Teichholz formula for the M-Mode. The use of this formula in B-Mode is not supported by any bibliographic reference but it is based on widely clinical practice.

## Left Ventricle Outflow Tract

**OUTFLOW TRACT**

This group includes the following measurements:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| LVOT DIAM | LV outflow tract diameter | LVOD | Distance |
| LVOT AREA | Outflow tract area | LVOA | Profile |

LV: Left ventricle

The **area** (OTA) of the outflow tract is obtained once the measurement is completed.

## Aorta

This group includes the following measurements:

**AORTA**

| Parameter | | Abbreviation | Measure-ment |
|---|---|---|---|
| AO DIAM | Aortic diameter | AOD | Distance |
| AO PLAN | Aortic planimetry | AVA | Profile |
| AO OPENIN | Aortic valve opening | AVO | Distance |

The aortic **area** (AOA) is obtained once the measurement is completed.

## Left Atrium

**LA**

This group includes the following measurement:

| Parameter | | Abbreviation | Measure-ment |
|---|---|---|---|
| LA DIAM | Left atrium diameter | LAD | Distance |

## Right Ventricle

**RV**

This group includes the following measurement:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| RVDd | RV diameter - Diastole | RVDd | Distance |

RV: right ventricle

## Pulmonary Artery

**PA**

This group includes the following measurement:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| PA DIAM | Pulmonary artery diameter | PAD | Distance |

The following parameter is automatically calculated once the measurement has been taken:

| Parameter | |
|---|---|
| PAA | Pulmonary artery area |

### Mitral

MITRAL

This group includes the following measurements:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| ANN DIAM | Mitral annulus diameter | MAN | Distance |
| ANN AREA | Mitral annulus area | MAA | Profile |
| MIT AREA | Mitral area | MVA | Profile |

## Cardiac Calculations in M-Mode

### Left Ventricle

LV

The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| RV DIAM d | RV Diameter-diastolic | RVDd | Distance |
| IVS dia | IV Septum-diastolic | IVSd | Distance |
| LV DIAM d | LV Diameter-diastolic | LVDd | Distance |
| PW dia | Post wall-diastolic | PWd | Distance |
| IVS sys | IV Septum-systolic | IVSs | Distance |
| LVD sys | LV Diameter.systolic | LVDs | Distance |
| PW sys | Post wall-systolic | PWs | Distance |

LV: Left ventricle
RV: Right ventricle

The following parameters are automatically calculated once the measurements are complete:

| Parameter | |
|---|---|
| EF | Ejection fraction |
| FS | Fractional shortening |
| LVVd | Diastolic volume |
| LVVs | Systolic volume |
| CO | Cardiac output |
| S% | Septum thickening |
| PW% | Post wall thickening |
| LVM | Left ventricle mass |
| LVMI | Left ventricle mass index |

LV Mass

### Left Ventricle Mass

The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| IVS dia | IV Septum-diastolic | IVSd | Distance |
| LV DIAM d | LV Diameter-diastolic | LVDd | Distance |
| PW dia | Post wall-diastolic | PWd | Distance |

LV: Left ventricle

The following parameters are automatically calculated once the measurements are complete:

| Parameter | |
|---|---|
| LVM | Left ventricle mass |
| LVMI | Left ventricle mass index |

EF

## Ejection Fraction

The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| LV DIAM d | LV Diameter-diastolic | LVDd | Distance |
| LVD sys | LV Diameter.systolic | LVDs | Distance |

LV: Left ventricle

The following parameters are automatically calculated once the measurements are complete:

| Parameter | |
|---|---|
| EF | Ejection fraction |
| FS | Fractional shortening |

## Aorta and Left Atrium

AORTA/LA

This group is composed of the following measurements:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| AO DIAM | Aortic diameter | AOD | Distance |
| LA | Left atrium | LA | Distance |
| AO OPENIN | Aortic valve opening | AVO | Distance |
| EJECT TIM | Ejection time | ET | Time |
| R-R INT | R-R Interval | R-R | Time |
| AO COAPT | AO Coaptation Line | AOC | Distance |

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter |
|---|

| | |
|---|---|
| LA/A | Left atrium/aortic diameter |
| AOEI | AO Excentricity index |

### Mitral

**MITRAL**

The following parameters can be measured:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| E SEPTUM | E Septum | ESD | Distance |
| EF Slope | EF Slope | EFS | Slope |

## Cardiac Calculations in Doppler

### Mitral

**MITRAL**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| MIT FVI | Mitral flow profile | MFVI | Profile |
| PEAK V-E | Mitral Peak Vel E Wave | MEVp | Velocity |
| PEAK V-A | Mitral Peak Vel A Wave | MAVp | Velocity |
| PHT MIT | PHT | MPHT | Slope |
| E ACC TIM | Mitral E Wave Acc Time | MEAT | Time |
| E DEC TIM | Mitral E Wave Dec Time | MEDT | Time |
| ISOV REL | Mitral Isov Relax Time | MIRT | Time |

Once the measurements are complete the following parameters are automatically calculated:

| Parameter | |
|---|---|
| MEGp | Mit Peak Grad (E) |
| MAGp | Mit Peak Grad (A) |
| MVmn | Mean Velocity |
| MGmn | Mean Gradient |
| MVA | Mitral Area |
| E/A | Mit peak Vel E Wave/Mit peak Vel A Wave |

**MITRAL AREA**

This group includes the following parameter:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| MPHT | Mitral area | MPHT | Time |

Once the measurements are complete the following parameter is automatically calculated:

| Parameter | |
|---|---|
| MVA | Mitral Area |

## Mitral Regurgitation

MIT REGURGE

This group includes the following parameter:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| REG VEL | Regurgitation velocity | MVrg | Velocity |

Once the measurements are complete, the **regurgitation gradient** (MGrg) is calculated automatically.

## Aorta

AORTA

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| AO FLOW | Aortic flow | AFVI | Profile |
| AO VEL | Aortic velocity | AVp | Velocity |
| DIA VEL | Aortic diastolic velocity | AVd | |
| ACC TIME | Acceleration time | AAT | Time |
| EJECT TIME | Ejection time | ET | Time |

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| AVmn | Mean velocity |
| AGmn | Mean gradient |
| AGp | Peak gradient |

## Aortic Area

AO EFF A

This measurement requires a CW trace for the aortic flow, a trace for the LVOT flow and B-Mode image for measuring the diameter. This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| AO FLOW | Aortic Flow Profile | AFVI | Profile |
| LVOT FLOW | LVOT flow profile | OFVI | Profile |

The group parameters are measured in three phases.

### Performing the Measurements

Acquire the aortic flow and press **FREEZE**.

Press **MEASURE** to activate the menu, select the "Aortic Area Aortic Flow profile **ENTER**.

Follow the instructions on the screen for measuring the velocity integral.

Press **FREEZE** to return to Real Time and acquire the left ventricle outflow.

Press and then **MEASURE** to activate the menu.

Follow the instructions on the screen to measure the velocity integral of the left ventricle.

Press **FREEZE** and then **B-MODE** to return to Real Time and acquire the left ventricle image.

Press **FREEZE** and then **MEASURE** to reactivate the menu and to complete the measurements

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| OTA | Outflow tract area |
| AVA | Aortic effective valve area |
| LVOD | LVOT diameter |

## Aortic Regurgitation

**AO REGURGE**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| REG PHT | AO regurge PHT | APHT | Slope |

## Descending Aorta

**DESC AORTA**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| SYS Vpeak | DA Systolic Peak Velocity | DAVp | Velocity |
| PDA | Patent ductus artery | PDA | Velocity |

Once the measurements are complete, the **Peak gradient** (DAGp) is calculated automatically.

## LVOT Flow

**LVOT FLOW**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| LVOT FLOW | LVOT flow profile | OFVI | Profile |
| LVOT VEL | LVOT peak velocity | OVp | Velocity |

Once the measurements are complete, the following parameters are calculated:

| Parameter | |
|---|---|
| OVmn | Mean velocity |
| OGmn | Mean gradient |
| OGp | Peak gradient |

## Tricuspid

**TRICUSPID**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| TRIC FVI | Tricusp flow profile | TFVI | Profile |
| PEAK V-E | Tricuspid Velocity E Wave | TEVp | Velocity |
| PEAL V-A | Tricuspid Velocity A Wave | TAVp | Velocity |

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| TEGp | Tricuspid Peak Gradient (E) |
| TAGp | Tricuspid Peak Gradient (A) |
| TVmn | Tricuspid Mean Velocity |
| TGmn | Tricuspid Mean Gradient |
| E/A | Tricuspid Velocity E Wave/ Tricuspid Velocity A Wave |

## Tricuspid Regurgitation

**TRIC REGURGE**

This group includes the following parameter:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| REG VEL | Tric reg velocity | TRV | Velocity |

Once the measurements are complete, the following parameters are calculated:

| Parameter | |
|---|---|
| TRG | Tricuspid Flow Gradient |
| RVPs | RV Systolic Pressure |

## Pulmonary Veins

**PULM VEINS**

This group includes the following parameters:

| Parameter | | Abbreviation | Measure-ment |
|---|---|---|---|
| PV SYS V | PV systolic velocity | PVVs | Velocity |
| DIAST VEL | PV diastolic velocity | PVVd | Velocity |
| REV ATR V | Reverse arterial velocity | RAV | Velocity |

Once the measurements are complete, the **SVDV** is calculated automatically.

## Pulmonary Artery

**PULM ARTERY**

This group includes the following parameters:

| Parameter | | Abbreviation | Measure-ment |
|---|---|---|---|
| PULM FLOW | Pulm flow profile | PFVI | Profile |
| PULM Vp | Pulm peak velocity | PVp | Velocity |

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| PVmn | Mean velocity |
| PGmn | Mean gradient |
| PGp | Peak gradient |
| PAP | Pulmonary artery pressure |

## Pulmonary Regurgitation

**PULM REG**

This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| REG PHT | Pulm reg PHT | PPHT | Slope |
| PDIAS VEL | Pulm protodiast velocity | PVpd | Velocity |
| EDIAS VEL | Pulm enddiast velocity | PVed | Velocity |

## Cardiac Output - LVOT

**CO-LVOT**

This measurement requires the acquisition of a Doppler trace and a B-Mode image. This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| LVOT FLOW | LVOT flow profile | OFVI | Profile |
| R-R INT | R-R interval | R-R | Time |
| LVOT DIAM | LVOT diameter | LVOD | Distance |

The parameters of this group are measured in two phases.

**Performing the Measurements**

Acquire a Doppler trace and press **FREEZE**.

Press **MEASURE** to activate the menu, select "**CO-LVOT**"

Follow the instructions on the screen to measure the regurgitation profile and the R-R interval.

Press **FREEZE** to return to Real Time and go to **B-MODE**.

Acquire a B-Mode image and press **FREEZE**.

Display the required frame then press **MEASURE** to reactivate the menu.

Follow the instructions on the screen to complete the measurements.

The following parameters are calculated automatically:

| Parameter | |
|---|---|
| HR | Heart rate |
| OTA | LVOT area |
| SV | Stroke volume |
| SI | Stroke index |
| CO | Cardiac output |
| CI | Cardiac index |

## Cardiac Output - Aorta

**CO-AORTA**

This measurement requires the acquisition of a Doppler trace and a B-Mode image. This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| AO FLOW | Aortic flow profile | AFVI | Profile |
| R-R INT | R-R interval | R-R | Time |
| AO DIAM | AO diameter | AOD | Distance |

The parameters of this group are measured in two phases.

**Performing the Measurements**

Acquire a Doppler trace and press **FREEZE**.

Press **MEASURE** to activate the menu, select the "CO-AORTA" group

Follow the instructions on the screen to measure the regurgitation profile and the R-R interval.

Press **FREEZE** to return to Real Time and go to **B-MODE**.

Acquire a B-Mode image and press **FREEZE**.

Display the required frame then press **MEASURE** to reactivate the menu.

Follow the instructions on the screen to complete the measurements.

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| HR | Heart rate |
| AOA | Aorta area |
| SV | Stroke volume |
| SI | Stroke index |
| CO | Cardiac output |
| CI | Cardiac index |

## Cardiac Output - Pulmonary

**CO-PULM**

This measurement requires the acquisition of a Doppler trace and a B-Mode image. This group includes the following parameters:

| Parameter | | Abbreviation | Measurement |
|---|---|---|---|
| PULM FLOW | Pulmonary flow profile | PFVI | Profile |
| R-R INT | R-R interval | R-R | Time |
| PA DIAM | Pulmonary diameter | PAD | Distance |

The group parameters are measured in two phases.

**Performing the Measurements**

Acquire a Doppler trace and press **FREEZE**.

Press **MEASURE** to activate the menu, select the "CO-PULM" group

Follow the instructions on the screen to measure the regurgitation profile and the R-R interval.

Press **FREEZE** to return to Real Time and go to **B-MODE**.

Acquire a B-Mode image and press **FREEZE**.

Display the required frame then **MEASURE** to reactivate the menu.

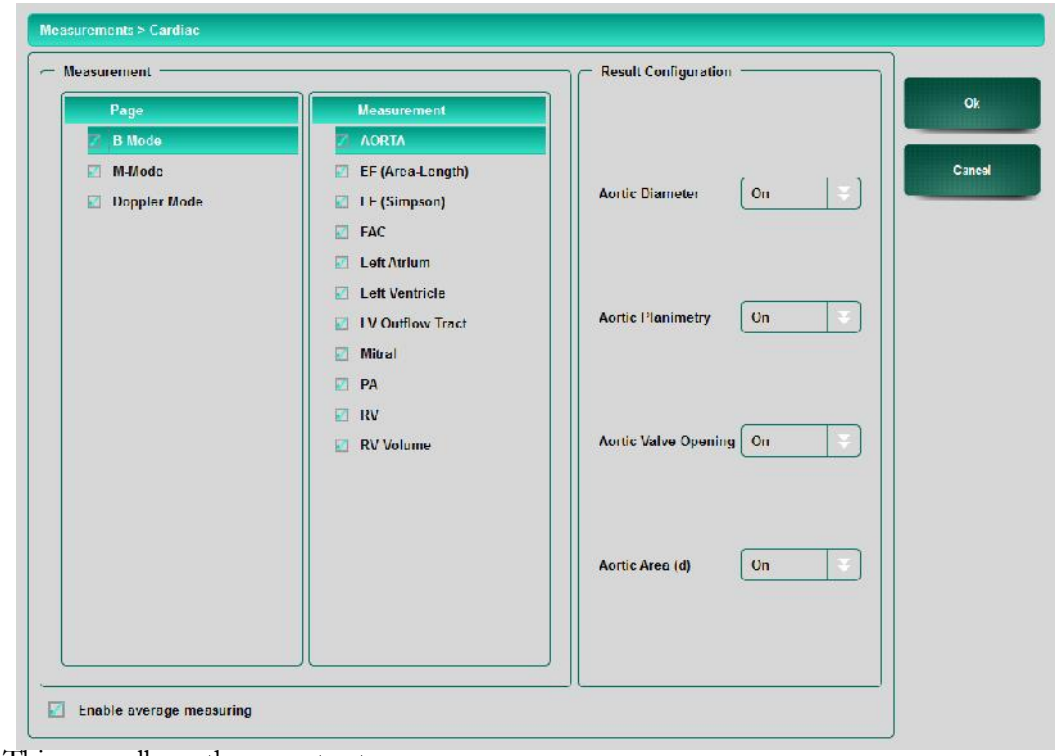
Follow the instructions on the screen to complete the measurements.

Once the measurements are complete, the following parameters are calculated automatically:

| Parameter | |
|---|---|
| HR | Heart rate |
| PAA | Pulmonary area |
| SV | Stroke volume |
| SI | Stroke index |
| CO | Cardiac output |
| CI | Cardiac index |

## Setup

Under **SETTINGS** tab press the **MENU** button and follow **MEASUREMENTS & ANALYSIS** – Cardiac to open the Cardiac configuration page:




This page allows the operator to:

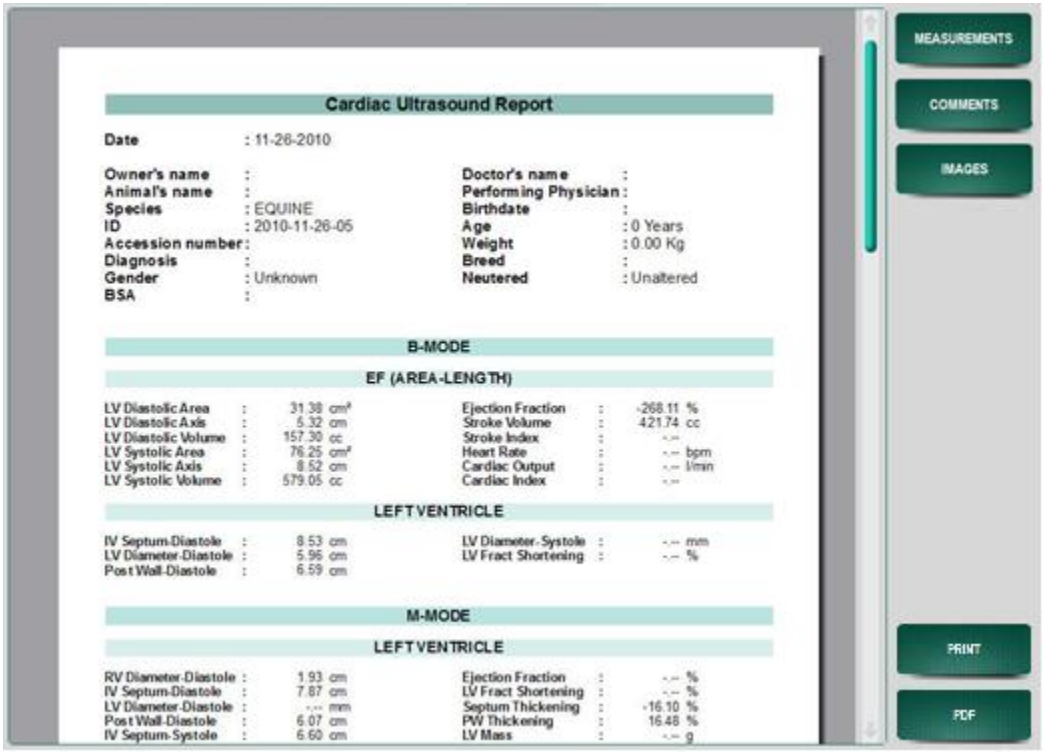
- Include/exclude measurement pages per operating modes.
- Include/exclude single measurements for each operating mode.
- For the enabled measurements, it is possible to define how the parameters have to be measured:
    - Off disables the parameter calculation from the selected measurement.

- On enables the parameter calculation in the selected measurement.

- Enable the average computation for the repeated measurements.

## Cardiac Report

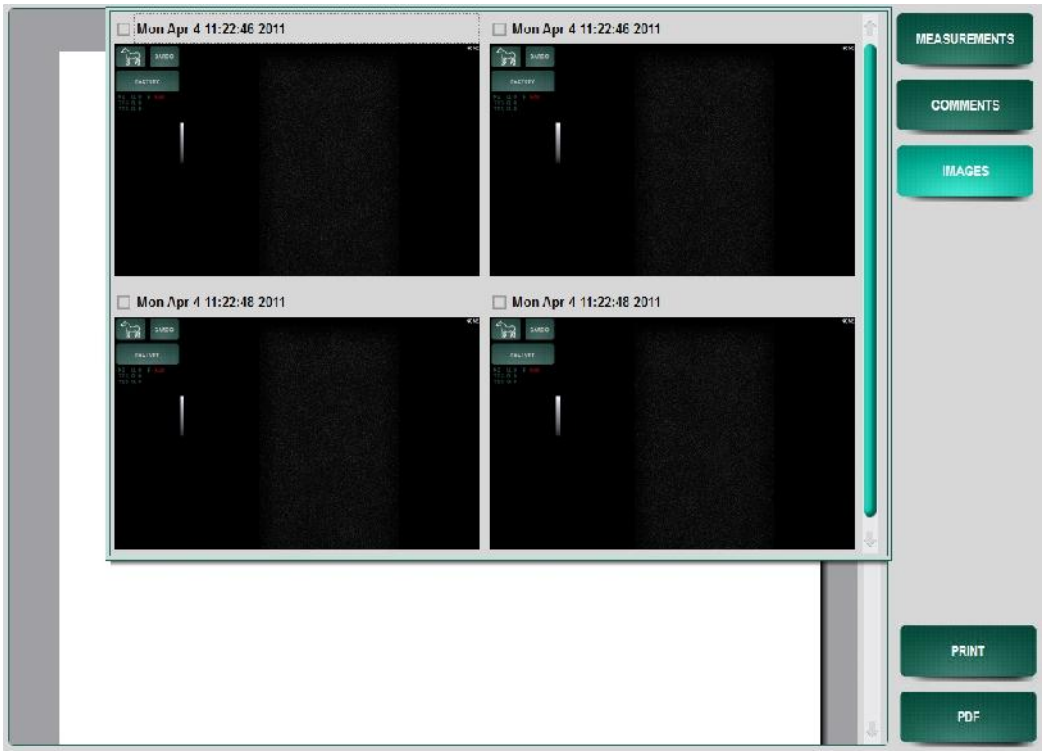
Pressing the **REPORT** tab on the control panel opens the Cardiac Report.



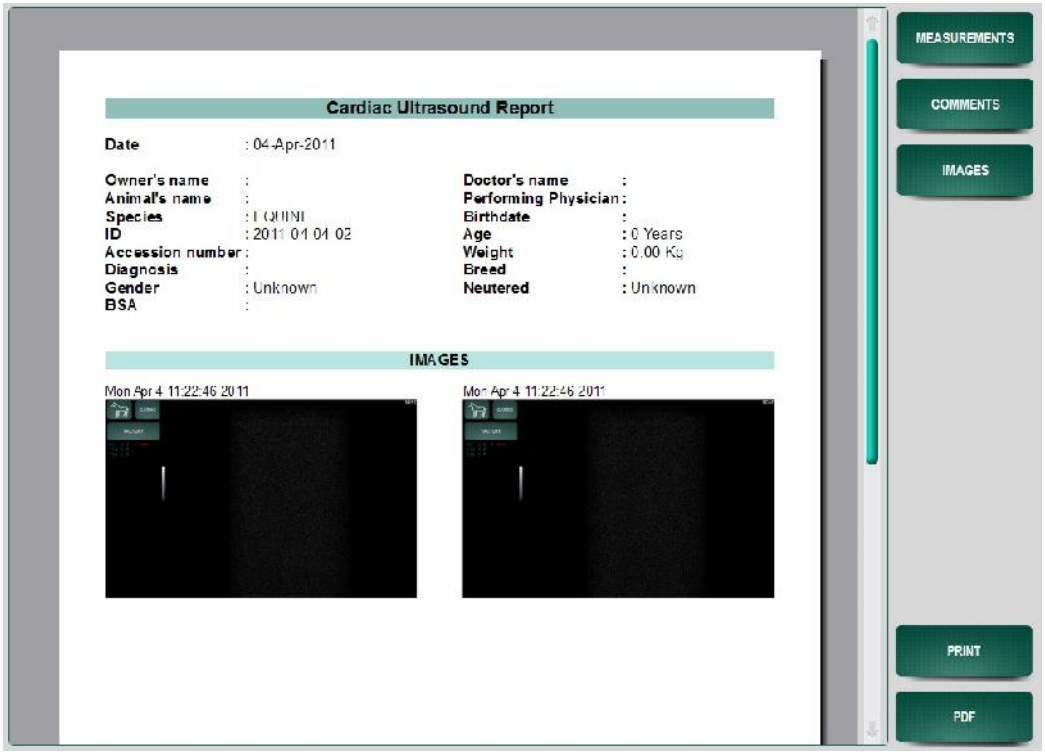

The **COMMENTS** key allows the user to add comments at the end of the report. When pressing the comments key, the comments window appears allowing data to be edited in the empty field by use of the keyboard. Also predefined comment can be added to the report by checking the involved checkbox. These comments can be defined in the **REPORT** menu of the **DISPLAY** menu in the **SYSTEM SETUP** menu

The **MEASUREMENTS** key opens a window which displays all the measurements and calculations performed. Each measurement can be selected to be shown in the report. Different sections can be selected by the corresponding tabs.

The **IMAGES** key makes it possible to add pictures to the report that were taken during the exam. In the submenu **IMAGES** the pictures can be selected by ticking their corresponding boxes.




To add the pictures to the report press **IMAGES** once more. The result can be seen in the picture below.




Examples of pages with different sections are reported hereinafter.

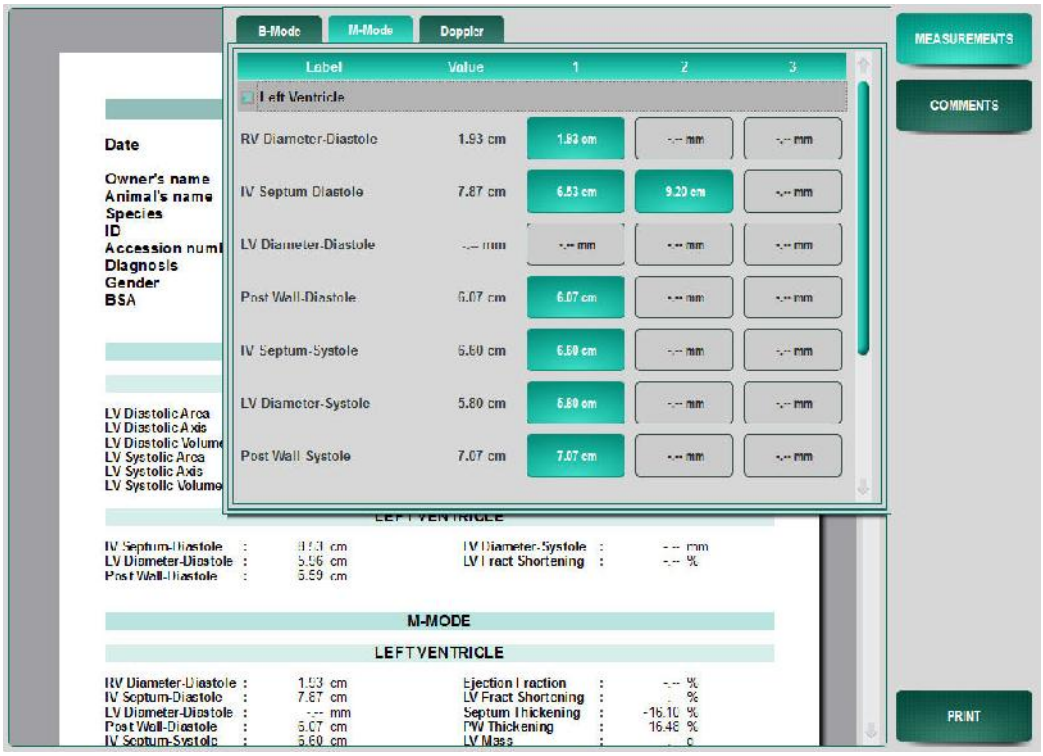
## B-Mode

The B-Mode page displays all the measurements and calculations that have been performed in B-Mode.


In case of repeated measurements, single measurements can be unchecked or checked in order to exclude or include them in the mean value calculation (if the average calculation is enabled in the setup).

## M-Mode

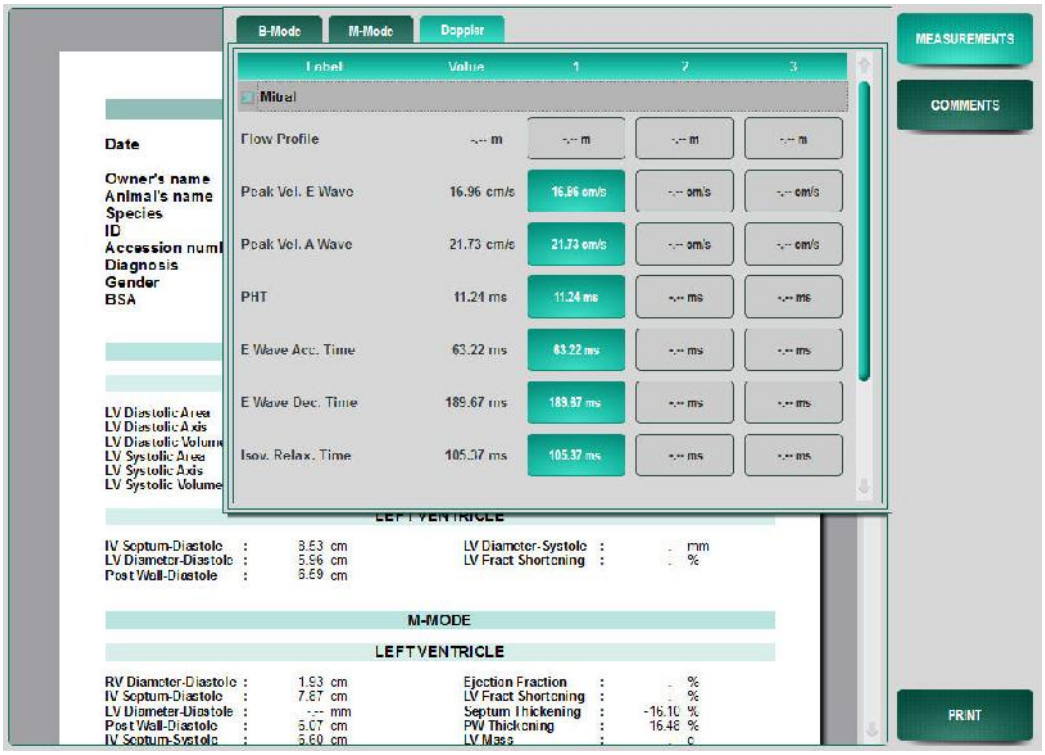
The M-Mode page displays all the measurements and calculations that have been performed in M-mode.




In case of repeated measurements, single measurements can be unchecked or checked in order to exclude or include them in the mean value calculation (if the average calculation is enabled in the setup).

## Doppler

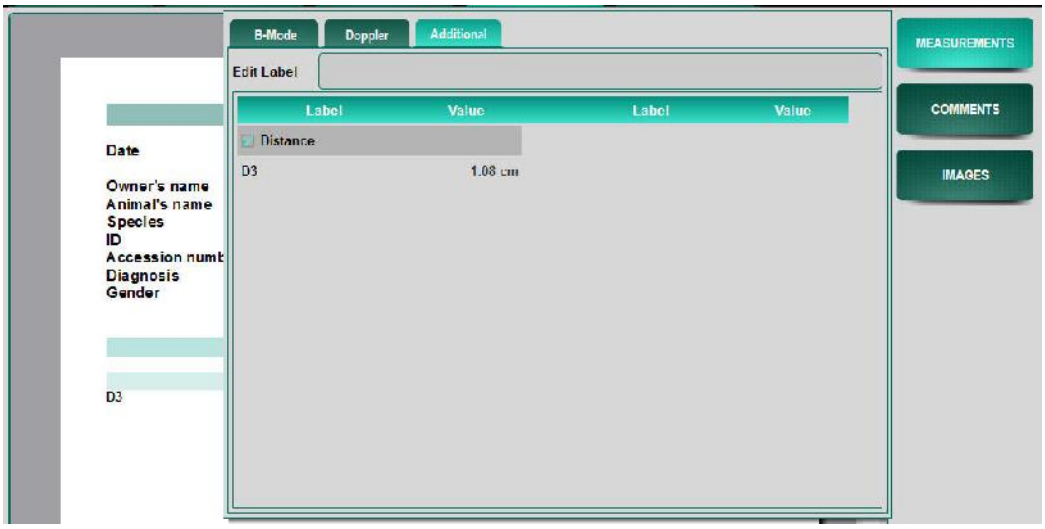
The Doppler page displays all the measurements and calculations that have been performed in Doppler mode.




In case of repeated measurements, single measurements can be unchecked or checked in order to exclude or include them in the mean value calculation (if the average calculation is enabled in the setup).

### Additional

The additional page displays all generic measurements which have been added to the report with the **ADD TO REPORT** key. In addition there is the option to rename the label of the measurement. To rename the label, select a measurement from the list and enter a new name in the "Edit Label" field and confirm with **enter.**



# Bibliographic References and Formulas in B-Mode

| LV Volume Simpson Formula | Measure unit | Derived parameters |
|---|---|---|
| LVVd and LVVs =($\pi$/4) * (h/20) * $\Sigma_{1-20}$ $d_h$ $D_h$<br>h: Long axis<br>$d_h$: A2C diameter<br>$D_h$: A4C diameter<br>V: Volume | ml | - |
| Accuracy: ± 15% | | |
| Schiller N.B., ..., Two-Dimensional Echocardiographic Determination of Ventricular Volume, Systolic Function and Mass. In: *Summary and Discussion of the 1989 Recommendations of the American Society of Echocardiography* | | |

| LV Volume (A-L) Formula | Measure unit | Derived parameters |
|---|---|---|
| LVVd and LVVs = 8 * $A^2$ / (3 * $\pi$ * D)<br>A: Area<br>D: Long axis | ml | - |
| Accuracy: ± 21% | | |
| Schiller N.B., ..., Two-Dimensional Echocardiographic Determination of Ventricular Volume, Systolic Function and Mass. In: *Summary and Discussion of the 1989 Recommendations of the American Society of Echocardiography* | | |

| Ejection Fraction (Simpson and A-L) Formula | Measure unit | Derived parameters |
|---|---|---|
| EF = (A-B)*100/A<br>A: LV diastolic volume<br>B: LV systolic volume | - | - |
| Accuracy: ± 42% | | |
| Feigenbaum H., Echocardiography, 4th Ed., Lea & Febiger, Philadelphia, 1986, pp. 153-155. | | |

| Stroke Volume Formula | Measure unit | Derived parameters |
|---|---|---|
| SV = A - B<br>A: LV diastolic volume<br>B: LV systolic volume | ml | - |
| Accuracy: ± 42% | | |
| Weyman A., Principles and Practice of Echocardiography, Lea & Febiger, 1994, p. 605 | | |

| Stroke Index<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| SI = A/B<br>A: Stroke volume<br>B: BSA | - | - |
| Oh J, Seward J, Tajik A The echo manual-Second edition, Lippincott Williams &Wilkins | | |

| Cardiac Output<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| CO = (A – B) * HR<br>A: LV diastolic volume<br>B: LV systolic volume | l/min | - |
| Accuracy: ± 45% | | |
| Weyman A., Principles and Practice of Echocardiography, Lea & Febiger, 1994, p. 605 | | |

| Cardiac Index<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| CI = A/B<br>A: Cardiac output<br>B: BSA | - | - |
| Oh J, Seward J, Tajik A The echo manual-Second edition, Lippincott Williams &Wilkins | | |

| Area Fractional Shortening<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| FAC = (A-B)*100/A<br>A: LV diastolic area<br>B: LV systolic area | - | - |
| Accuracy: ± 16% | | |

| Diameter Fractional Shortening<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| FS = (A - B)*100/A<br>A: LV diastolic diameter<br>B: LV systolic diameter | - | - |
| Accuracy: ± 10% | | |
| Quinones M.A., Gaasch W.H., Alexander J.K., "Echocardiographic Assessment of Left Ventricular Function with Special Reference to Normal Velocities". In: Circulation, 1974 , 50, p. 42. | | |

| Ejection Fraction (LV Group)<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| EF = (A - B)*100/A | - | A: [7 * D $^3$] / [2.4 + D ]<br>D: LV Diameter in diastole<br>B: [7 * D $^3$] / [2.4 + D ]<br>D: LV Diameter in systole |

| LV Mass<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| LVM = 0.8 * $\{1.04[(A + B + C)^3 - A^3]\}$ + 0.6<br>A: LV internal diameter – Diastole<br>B: Post wall - Diastole<br>C : Intraventricular septum - Diastole | g | - |
| Accuracy: ± 15% | | |
| Lang R, Bierig M, Devereux R,.. Recommendations for chamber quantification: a report from the American Society of Echocardiography's Guidelines and Standards Committee and the Chamber Quantification Writing Group, developed in conjunction with the European Association of Echocardiography, a branch of the European Society of Cardiology In: J Amer. Soc. Echocardiography, 2005, Vol.18; N.12; pp1440-1463. | | |

| Outflow Tract Area<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| OTA=Π * $(D/2)^2$<br>D: Outflow tract diameter | $cm^2$ | - |

| Aortic Valve Opening<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| AAO=Π * $(D/2)^2$<br>D: Aortic diameter | $cm^2$ | - |

| RV Volume<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| RVV = A * D*2/3<br>A: RV Area<br>D: RV long axis | ml | - |
| Accuracy: ± 21% | | |

| Pulmonary Artery Area<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| PAA=Π * $(D/2)^2$<br>D: Pulmonary Artery diameter | $cm^2$ | - |

| LA Volume Formula | Measure unit | Derived parameters |
|---|---|---|
| LAV= (0.85 * A * B)/C<br>A: Left atrium area – 4AC<br>B: Left atrium area – 2AC<br>C: Left atrium length | ml | - |
| Accuracy: ± 24% | | |
| Oh J, Seward J, Tajik A The echo manual-Second edition, Lippincott Williams &Wilkins | | |

## Bibliographic References and Formulas in M-Mode

| LV Ejection Fraction Formula | Measure unit | Derived parameters |
|---|---|---|
| EF = (A-B)*100/A | - | A=(7 * $D^3$)/(2,4 * D)<br>D: LV diastolic diameter (cm)<br>B=(7 * $D^3$)/(2,4 * D)<br>D: LV systolic diameter (cm) |
| Accuracy: ± 30% | | |
| Teichholz L.E., ... , Problems in Echocardiographic Volume Determinations: Echocardiographic/Angiographic Correlations in the Presence or Absence of Asynergy. In: American Journal of Cardiology, 37, January 1976.1986, pp. 153-155. | | |

| LV Fractional Shortening Formula | Measure unit | Derived parameters |
|---|---|---|
| FS = (A - B)*100/A<br>A: LV diastolic diameter<br>B: LV systolic diameter | - | - |
| Accuracy: ± 10% | | |
| Feigenbaum H., Echocardiography, 4th Edition, Lea & Febiger, Philadelphia, 1986, pp. 153-155. | | |

| Septum Thickening Formula | Measure unit | Derived parameters |
|---|---|---|
| S% = (A - B)*100/B<br>A: systolic interventricular septum<br>B: diastolic interventricular septum | - | - |
| Accuracy: ± 10% | | |
| Feigenbaum H., Echocardiography, 4th Ed., Lea & Febiger, Philadelphia, 1986, pp. 153-155. | | |

| Posterior Wall Thickening<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| PW% = (A - B)*100/B<br>A: systolic posterior wall<br>B: diastolic posterior wall | - | - |
| Accuracy: ± 10% | | |
| Feigenbaum H., Echocardiography, 4th Ed., Lea & Febiger, Philadelphia, 1986, pp. 153-155. | | |

| LV Mass<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| $LVM=1.04[(A+B+C)^3 – B^3] – 13.6$<br>A: diastolic interventricular septum<br>B: LV diastolic diameter<br>C: diastolic posterior wall | g | - |
| Accuracy: ± 15% | | |
| Devereux R.B., Reichek N., ..., Echocardiographic Determination of Left Ventricular Mass in Man - Anatomic Validation of the Method. In: Circulation, n.55, 1977, pp. 613-8 | | |

| LV Mass Index<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| LVMI=LVM/BSA<br>LVM: LV Mass<br>BSA: Body Surface Area | - | - |
| Accuracy: ± 15% | | |
| Devereux R.B., Reichek N., ..., Echocardiographic Determination of Left Ventricular Mass in Man - Anatomic Validation of the Method. In: Circulation, n.55, 1977, pp. 613-8 | | |

| LA/Aorta Diameter<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| LA/AD =A/B<br>A: Left Atrium<br>B: Aortic diameter | - | - |
| Accuracy: ± 10% | | |

| Excentricity Index<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| EXC IND =A/B | - | - |

A: Aortic diameter

B: Aortic coaptation line

Accuracy: ±10%

Nanda N.C., Gramiak R.: Evaluation of Bicuspid Valves by Two-Dimensional Echocardiography. In: American J. Cardiol. 1987, 11 p.372

## Bibliographic References and Formulas in Doppler

| Peak Gradient<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| $Gp = 4*V^2$<br>V: Peak velocity | mmHg | - |
| Accuracy: ± 16% | | |
| Weyman A., Principles and Practice of Echocardiography, Lea & Febiger, 1994, p. 605 | | |

| Mean Velocity<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| Vmn = FVI/t | m/s | t=flow duration |
| Accuracy: ± 11% | | |

| Mean Gradient<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| $Gmn = 4 * (V1^2 + V2^2 + \text{-------} + Vn^2)/n$<br>Vi: Instant velocities | mmHg | - |
| Accuracy: ± 11% | | |
| Weyman A., Principles and Practice of Echocardiography, Lea & Febiger, 1994, p. 605 | | |

| PHT<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| $PHT = V_{Max} * (1 - 0.707)/Slope$ | ms | - |
| Accuracy: ± 28% | | |
| Hatle L., Angelsen B., Noninvasive Assessment of Atrioventricular Pressure Half-Time by Doppler Ultrasound. In: Circulation 60, n.5, 1979, pp. 1096-1104 | | |

| Mitral Valve Area<br>Formula | Measure unit | Derived parameters |
|---|---|---|
| $MVA = 220/PHT$ | $cm^2$ | - |
| Accuracy: ± 28% | | |
| Weyman A., Principles and Practice of Echocardiography, Lea & Febiger, 1994, p. 605 | | |

| E Wave/A WAve<br>Formula | Measure unit | Derived parameters |
|---|---|---|

| | | |
|---|---|---|
| E/A=A/B | - | - |
| A: E wave peak velocity | | |
| B: A wave peak velocity | | |
| Accuracy: ± 10% | | |

| **Miocardiac Performance Index**<br>**Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| MPI = (A+B)/C | - | - |
| A: Isovolumetric Contraction Time | | |
| B: Isovolumetric Relax Time | | |
| C: Ejection Time | | |
| Accuracy: ± 6% | | |
| C.Bruch, A.Schmermund .."TEI-index in patients with mid-to-moderate congestive heart failure", In: Eu. H.J. 2000, n.21 pp.1888-1895 | | |

| **dP/dt Ratio**<br>**Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| dP/dt = 32/t | mmHg/s | - |
| t: time elapsed between –1m/s to –3m/s velocity values | | |
| Accuracy: ± 3% | | |
| Bargiggia GS, Bertucci C,…, Anew method for estimating left ventricular dP/dt by continuous wave Doppler echocardiography. Validation studies at cardiac catheterisation, In: Circulation 1989; 80; 1287-1292 | | |

| **Regurgitation Flow (PISA)**<br>**Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| $REG = 6.28 * R^2 * V$ | ml/s | - |
| R: Radius | | |
| V: Aliasing velocity | | |
| Accuracy: ± 14% | | |
| Bargiggia G.S., Tronconi L., Sahn D.J. …, A New Method for Quantitation of Mitral Regurgitation Based on Color Flow Doppler Imaging of Flow Convergence Proximal to Regurgitant Orifice. In: Circulation, 1991, 84: pp. 1481-1489 | | |

| **Effective Regurgitation Orefice (PISA)**<br>**Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| $O = 6.28 * R^2 * V1 / V2$ | ml | - |
| R: Radius | | |

| |
|---|
| V1: Aliasing velocity<br>V2: Regurgitation peak velocity |
| Accuracy: ± 22% |
| Oh J, Seward J, Tajik A The echo manual-Second edition, Lippincott Williams &Wilkins |

| Mitral Regurgitation Volume (PISA) Formula | Measure unit | Derived parameters |
|---|---|---|
| MVOL = 6.28 * $R^2$ * V / 3.25<br>R: Radius<br>V: Aliasing velocity | ml | - |
| Accuracy: ± 14% | | |
| Rossi A., Dujardin K.S., …, Rapid Estimation of Regurgitant Volume by the Proximal Isolvelocity Surface Area Method in Mitral Regurgitation: Can Continuous-Wave Doppler Echocardiography Be Omitted? In: Journal of the American Society of Echocardiography. Volume 11, Number 2, pp. 138-148. | | |

| Aortic Regurgitation Volume (PISA) Formula | Measure unit | Derived parameters |
|---|---|---|
| REG VOL = 6.28 * $R^2$ * V1 * FVI / V2<br>R: R Radius<br>V1: aliasing velocity<br>FVI: flow velocity integral<br>V2: Regurge peak velocity | ml | - |
| Accuracy: ± 30% | | |
| Shiota T., Jones M., Yamada I., …, Effective Regurgitant orifice Area by the Color Doppler Flow Convergence Method for Evaluating the Severity of Chronic Aortic Regurgitation. An Animal Study. In: Circulation, 1996; 93; pp. 594-602. | | |

| E' Wave/A' Wave Formula | Measure unit | Derived parameters |
|---|---|---|
| E'/A' =A/B<br>A: Peak velocity E' wave<br>B: Peak velocity A' wave | - | - |
| Accuracy: ± 16% | | |

| E Wave/E' Wave Formula | Measure unit | Derived parameters |
|---|---|---|
| E/E' =A/B<br>A: Peak velocity E wave<br>B: Peak velocity E' wave | - | - |

| |
|---|
| Accuracy: ± 16% |

| Intraventricular Mechanical Delay Formula | Measure unit | Derived parameters |
|---|---|---|
| IMD =A-B<br>A: Aorta Pre-ejection time<br>B: Pulmonary Pre-ejection time | ms | - |
| Accuracy: ± 9% | | |
| F.Knebel, R.K.Reibeis.., "Tissue Doppler Echocardiography and Biventricular Pacing Heart Failure: Patient Selection, Procedural Guidance, Follow up, quantification of Success", IN: Card Ultr 2004, n.2-17 | | |

| Effective Aortic Valve Area Formula | Measure unit | Derived parameters |
|---|---|---|
| AVA = A*FVI1/FVI2<br>A: LVOT area<br>FVI1: LVOT flow velocity integral<br>FVI2: aortic tract flow velocity integral | $cm^2$ | $A=\Pi*(D/2)^2$<br>D: LVOT diameter |
| Accuracy: ± 28% | | |
| Huntsman L., Stewart D., ..., Noninvasive Doppler Determination of Cardiac Output in Man, In: Circulation 67, n. 3, March 1983 | | |

| Maximal Aortic Valve Area Formula | Measure unit | Derived parameters |
|---|---|---|
| AMVA = A*V1/V2<br>A: LVOT area<br>V1: Aortic Peak velocity in LVOT<br>V2: Aortic Peak velocity | $cm^2$ | $A=\Pi*(D/2)^2$<br>D: LVOT diameter |
| Accuracy: ± 22% | | |
| Zaghbi WA, Farmer KL,…, Accurate non-invasive quantification of stenotic aortic valve area by Doppler echocardiography, In:Circulation 1986; 73; 452-459 | | |

| Systolic Pressure Formula | Measure unit | Derived parameters |
|---|---|---|
| $Ps = 4*V^2 + 10$<br>V: regurge velocity | mmHg | - |

| |
|---|
| Accuracy: ± 16% |
| Currie P.J., ..., Continuous Wave Doppler Determination of Left Ventricular Pressure: a Simultaneous Doppler Catheterization Study in 127 Patients. In: J. Amer. College Cardiol. 1985, 6, p.750 |

| **Systolic Velocity/Diastolic Velocity Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| VS/VD = A/B<br>A: systolic velocity<br>B: diastolic velocity | - | - |
| Accuracy: ± 10% | | |

| **Heart Rate Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| HR = 60/T<br>T: R-R interval | bpm | **-** |
| Accuracy: ± 3% | | |

| **Stroke Volume Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| SV = A * FVI<br>A: Area<br>FVI: Flow velocity | ml | $A=\Pi*(D/2)^2$<br>D: Diameter |
| Accuracy: ± 19% | | |
| Huntsman L., Stewart D., ..., Noninvasive Doppler Determination of Cardiac Output in Man, In: Circulation 67, n. 3, March 1983 | | |

| **Stroke Index Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| SI = A/B<br>A: Stroke Volume<br>B: BSA | - | - |
| Accuracy: ± 19% | | |
| Huntsman L., Stewart D., ..., Noninvasive Doppler Determination of Cardiac Output in Man, In: Circulation 67, n. 3, March 1983; Skjaerpe T, Hegrenaes L.…., Non invasive estimation of valve area in patients with aortic stenosis by Doppler ultrasound and two-dimensional echocardiography, In: Circulation 1985; 72; 810-818 | | |

| **Cardiac Output Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| CO = A*FVI*HR<br>A: Area | l/min | $A=\Pi*(D/2)^2$<br>D: Diameter |

FVI: Flow velocity integral

HR: heart rate

Accuracy: ± 21%

Huntsman L., Stewart D., ..., Noninvasive Doppler Determination of Cardiac Output in Man, In: Circulation 67, n. 3, March 1983

| **Cardiac Index Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| CI = A/B<br>A: Cardiac Output<br>B: BSA | - | - |
| Accuracy: ± 19% | | |
| Huntsman L., Stewart D., ..., Noninvasive Doppler Determination of Cardiac Output in Man, In: Circulation 67, n. 3, March 1983; Skjaerpe T, Hegrenaes L.…., Non invasive estimation of valve area in patients with aortic stenosis by Doppler ultrasound and two-dimensional echocardiography, In: Circulation 1985; 72; 810-818 | | |

| **Qp/Qs Ratio Formula** | **Measure unit** | **Derived parameters** |
|---|---|---|
| Qp/Qs = A/B<br>A: Pulmonary artery stroke volume<br>B: LVOT stroke volume | - | - |
| Accuracy: ± 42% | | |
| Sanders S.P., …, Measurement of Systemic and Pulmonary Blood Flow and Qp/Qs Ratio using Doppler and Two-Dimensional Echocardiography. In: Am. J. Cardiol. 1983, 51, p.952 | | |

# Formulas and Bibliographic References for Body Surface Area in Canine and Feline Cardio

In the Canine Cardio and Feline Cardio applications, the system automatically calculates the Body Surface Area (BSA), based on the animal weight and the following tables:

**Weight to Body Surface Area Conversion Chart – Canine (Dog)**

| kg | $m^2$ | kg | $m^2$ | kg | $m^2$ | kg | $m^2$ | kg | $m^2$ |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 0.064 | 10.0 | 0.469 | 20.0 | 0.744 | 30.0 | 0.975 | 40.0 | 1.181 |
| 1.0 | 0.101 | 11.0 | 0.500 | 21.0 | 0.759 | 31.0 | 0.997 | 41.0 | 1.201 |
| 2.0 | 0.160 | 12.0 | 0.529 | 22.0 | 0.785 | 32.0 | 1.018 | 42.0 | 1.220 |
| 3.0 | 0.210 | 13.0 | 0.553 | 23.0 | 0.817 | 33.0 | 1.029 | 43.0 | 1.240 |
| 4.0 | 0.255 | 14.0 | 0.581 | 24.0 | 0.840 | 34.0 | 1.060 | 44.0 | 1.259 |
| 5.0 | 0.295 | 15.0 | 0.608 | 25.0 | 0.864 | 35.0 | 1.081 | 45.0 | 1.278 |
| 6.0 | 0.333 | 16.0 | 0.641 | 26.0 | 0.886 | 36.0 | 1.101 | 46.0 | 1.297 |
| 7.0 | 0.370 | 17.0 | 0.668 | 27.0 | 0.909 | 37.0 | 1.121 | 47.0 | 1.302 |
| 8.0 | 0.404 | 18.0 | 0.694 | 28.0 | 0.931 | 38.0 | 1.142 | 48.0 | 1.334 |
| 9.0 | 0.437 | 19.0 | 0.719 | 29.0 | 0.953 | 39.0 | 1.162 | 49.0 | 1.352 |
| | | | | | | | | 50.0 | 1.371 |

**Weight to Body Surface Area Conversion Chart – Feline (Cat)**

| kg | m2 | kg | m2 | kg | m2 | kg | m2 | kg | m2 |
|---|---|---|---|---|---|---|---|---|---|
| 0.1 | 0.022 | 1.4 | 0.125 | 3.6 | 0.235 | 5.8 | 0.323 | 8.0 | 0.400 |
| 0.2 | 0.034 | 1.6 | 0.137 | 3.8 | 0.244 | 6.0 | 0.330 | 8.2 | 0.407 |
| 0.3 | 0.045 | 1.8 | 0.148 | 4.0 | 0.252 | 6.2 | 0.337 | 8.4 | 0.413 |
| 0.4 | 0.054 | 2.0 | 0.159 | 4.2 | 0.260 | 6.4 | 0.345 | 8.6 | 0.420 |
| 0.5 | 0.063 | 2.2 | 0.169 | 4.4 | 0.269 | 6.6 | 0.352 | 8.8 | 0.426 |
| 0.6 | 0.071 | 2.4 | 0.179 | 4.6 | 0.277 | 6.8 | 0.360 | 9.0 | 0.433 |
| 0.7 | 0.079 | 2.6 | 0.189 | 4.8 | 0.285 | 7.0 | 0.366 | 9.2 | 0.439 |
| 0.8 | 0.086 | 2.8 | 0.199 | 5.0 | 0.292 | 7.2 | 0.373 | 9.4 | 0.445 |
| 0.9 | 0.093 | 3.0 | 0.208 | 5.2 | 0.300 | 7.4 | 0.380 | 9.6 | 0.452 |
| 1.0 | 0.100 | 3.2 | 0.217 | 5.4 | 0.307 | 7.6 | 0.387 | 9.8 | 0.458 |
| 1.2 | 0.113 | 3.4 | 0.226 | 5.6 | 0.315 | 7.8 | 0.393 | 10.0 | 0.464 |

Reference: Withrow SJ, MacEwen, EG: *Small Animal Clinical Oncology, Second Edition, 1995,*. WB Saunders Company, Philadelphia, PA, USA

Chapter 3

# 3 - Abdominal Measurements Package

*Equine*

*Canine*

*Feline*

*Abdominal application icon*

This chapter describes the Abdominal measurements package (measurements and report environments) and lists the available measurements.

The Abdominal application package applies for the equine, canine and feline species.


**Note**

This application calculation package is only available when the corresponding license is activated. Please refer to the System Configuration manual for all the options/licenses of the **MyLab** and their status.

## Abdominal Application

The Abdominal application can be activated selecting the **ABDO** key from the application list.

When the Abdominal application is selected, in freeze mode, press the **MEASURE** key to activate the Abdominal measurements.

# Abdominal Measurements

## B-Mode Measurements

In each application this package allows distance measurements and volume calculations of up to 14 different organs (groups). Measurements and volume calculations are also provided for certain abnormalities (cysts, masses and calculi) For bilateral organs, a software toggle is available for selecting the right or left organ. The organ groups are detailed further:

KIDNEY

### KIDNEY Group

This package allows the following measurements:

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **SAGITTAL LENGTH** | Sagittal Length | Distance | Distance |
| **SAGITTAL HEIGHT** | Sagittal Height | Distance | Distance |
| **SAGITTAL AREA** | Sagittal Area | Area | Area |
| **TRANSVERSE HEIGHT** | Transverse Height | Distance | Distance |
| **TRANSVERSE WIDTH** | Transverse Height | Distance | Distance |
| **TRANSVERSE AREA** | Transverse Area | Area | Area |
| **VOLUME** | Volume | Volume | Volume |
| **CORTEX** | Cortex | Distance | Distance |
| **MEDULLA** | Medulla | Distance | Distance |
| **CORTEX/ MEDULLA RATIO** | Cortex/ Medulla ratio | %Distance | %Distance |
| **KIDNEY CALCULI DIAMETER** | KIDNEY CALCULI Diameter | Distance | Distance |
| **KIDNEY MASS1** | KIDNEY MASS1 | Complex volume | Complex volume |

### URINARY Group

This package allows the following measurements:

URINARY

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **Ureter Diameter** | Ureter Diameter | Distance | Distance |
| **Urinary Bladder Sagittal Length** | Urinary Bladder Sagittal Length | Distance | Distance |
| **Urinary Bladder Sagittal Height** | Urinary Bladder Sagittal Height | Distance | Distance |
| **Urinary Bladder Sagittal Area** | Urinary Bladder Sagittal Area | Area | Area |
| **Urinary Bladder Wall Thickness** | Urinary Bladder Wall Thickness | Distance | Distance |
| **Urinary Bladder Mass** | Urinary Bladder Mass | Complex volume | Complex volume |

## ADRENAL GLANDS Group

This package allows the following measurements:

ADRENAL GLANDS

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **Sagittal Length** | Sagittal Length | Distance | Distance |
| **Sagittal Area** | Sagittal Area | Area | Area |
| **ADRENAL GLAND MASS** | ADRENAL GLAND MASS | Complex volume | Complex volume |

## PANCREAS Group

This package allows the following measurements:

PANCREAS

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **Body thickness** | Body thickness | Distance | Distance |
| **Right lobe thickness** | Right lobe thickness | Distance | Distance |
| **Left lobe thickness** | Left lobe thickness | Distance | Distance |

## SPLEEN Group

This package allows the following measurements:

SPLEEN

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Head thickness** | Head thickness | Distance | SPL HEAD TH | Distance |
| **Body thickness** | Body thickness | Distance | SP BODY TH | Distance |
| **Tail Thickness** | Tail Thickness | Distance | SPL TAIL TH | Distance |

## GASTROINTESTINAL Group

This package allows the following measurements:

GASTRO

INTESTINAL

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **STOMACH BODY Thickness** | STOMACH BODY Thickness | Distance | ST BODY TH | Distance |
| **Duodenum Thickness** | Duodenum Thickness | Distance | DUODENUM TH | Distance |
| **Jejunum Thickness** | Jejunum Thickness | Distance | JEJUNUM TH | Distance |
| **ILEUM Thickness** | ILEUM Thickness | Distance | ILEUM | Distance |
| **COLON Thickness** | COLON Thickness | Distance | COLON TH | Distance |

## LIVER Group

This package allows the following measurements:

LIVER

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **Longitudinal distance** | Longitudinal distance | Distance | Distance |
| **Transverse distance** | Transverse distance | Distance | Distance |
| **LIVER MASS** | LIVER MASS | Complex volume | Complex volume |

## GALLBLADDER Group

This package allows the following measurements:

GALLBLADDER

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Sagittal Length** | Sagittal Length | Distance | SAG L | Distance |
| **Sagittal Height** | Sagittal Height | Distance | SAG H | Distance |
| **Sagittal Area** | Sagittal Area | Area | SAG A | Area |
| **Transverse Height** | Transverse Height | Distance | TRANSV H | Distance |
| **Transverse Width** | Transverse Width | Distance | TRANSV W | Distance |
| **Transverse Area** | Transverse Area | Area | TRANSV A | Area |
| **Volume** | Volume | Volume | VOLUME Only shown in worksheet | Volume |
| **GALLBLADDER WALL Thickness** | GALLBLADDER WALL Thickness | Distance | GALLB W TH | Distance |
| **Common Bile Duct** | Common Bile Duct | Distance | C BILE D | Distance |
| **GALLBLADDER CALCULI** | GALLBLADDER CALCULI | Distance | GLLB CAL1 | Distance |

## PROSTATE Group

This package allows the following measurements:

PROSTATE

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Sagittal Length** | Sagittal Length | Distance | SAG L | Distance |
| **Sagittal Height** | Sagittal Height | Distance | SAG H | Distance |
| **Sagittal Area** | Sagittal Area | Area | SAG A | Area |
| **Transverse Height** | Transverse Height | Distance | TRANSV H | Distance |
| **Transverse Width** | Transverse Width | Distance | TRANSV W | Distance |
| **Transverse Area** | Transverse Area | Area | TRANSV A | Area |
| **Volume** | Volume | Volume | VOLUME Only shown in worksheet | Volume |

## UTERUS Group

This package allows the following measurements:

UTERUS

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Diameter** | Diameter | Distance | DIAMETER | Distance |
| **Wall Thickness** | Wall Thickness | Distance | WALL | Distance |

## OVARY Group

This package allows the following measurements:

OVARY

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Sagittal Length** | Sagittal Length | Distance | SAGIT L | Distance |
| **Sagittal Height** | Sagittal Height | Distance | SAGIT H | Distance |
| **Sagittal Area** | Sagittal Area | Area | SAGIT A | Area |
| **Transverse Height** | Transverse Height | Distance | TRANSV H | Distance |
| **Transverse Width** | Transverse Width | Distance | TRANSV W | Distance |
| **Transverse Area** | Transverse Area | Area | TRANSV A | Area |
| **Volume** | Volume | Volume | VOLUME Only shown in worksheet | Volume |

## CAUDAL VENA CAVA Group

This package allows the following measurements:

CAUDAL VENA CAVA

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Transverse Diameter** | Transverse Diameter | Distance | TRANSV D | Distance |
| **Transverse Area** | Transverse Area | Area | TRANSV A | Area |

## PORTAL VEIN Group

This package allows the following measurements:

PORTAL VEIN

| Subgroup | Parameter | | Label | Measure |
|---|---|---|---|---|
| **Transverse Diameter** | Transverse Diameter | Distance | TRANSV D | Distance |
| **Transverse Area** | Transverse Area | Area | TRANSV A | Area |

## Doppler Measurements

In each application this package allows velocity and resistance index measurements of up to 4 different organs (groups). The organ groups are detailed further

### HEPATIC VEIN Group

This package allows the following measurements:

HEPATIC VEIN

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **SYSTOLIC VELOCITY** | Systolic velocity | Velocity | Velocity |
| **DIASTOLIC VELOCITY** | Diastolic velocity | Velocity | Velocity |

### KIDNEY Group

This package allows the following measurements:

KIDNEY

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **SYSTOLIC VELOCITY** | Systolic velocity | Velocity | Velocity |
| **DIASTOLIC VELOCITY** | Diastolic velocity | Velocity | Velocity |
| **RESISTANCE INDEX (R.I.)** | RESISTANCE INDEX | Dedicated formula | Resistance Index |

### PORTAL VEIN Group

This package allows the following measurements:

PORTAL VEIN

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **SYSTOLIC VELOCITY** | Systolic velocity | Velocity | Velocity |
| **DIASTOLIC VELOCITY** | Diastolic velocity | Velocity | Velocity |

### HEPATIC ATRERY Group

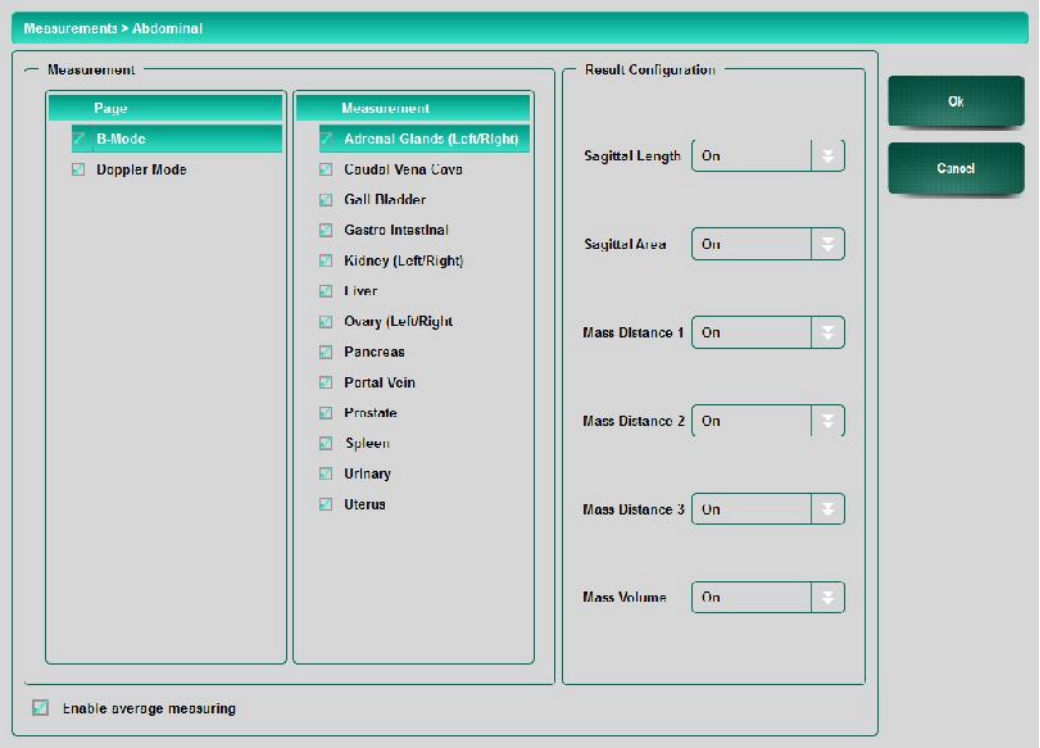
This package allows the following measurements:

HEPATIC ARTERY

| Subgroup | Parameter | | Measure |
|---|---|---|---|
| **SYSTOLIC VELOCITY** | Systolic velocity | Velocity | Velocity |
| **DIASTOLIC VELOCITY** | Diastolic velocity | Velocity | Velocity |
| **RESISTANCE INDEX (R.I.)** | RESISTANCE INDEX | Dedicated formula | Resistance Index |

## Setup

The Abdominal measurement package can be configured via the **SETTINGS** tab – **MENU - MEASUREMENTS & ANALYSIS – ABDOMINAL**. The Setup environment consists of the following page:




This page permits the user to include or exclude pages and, inside each page, measurements.

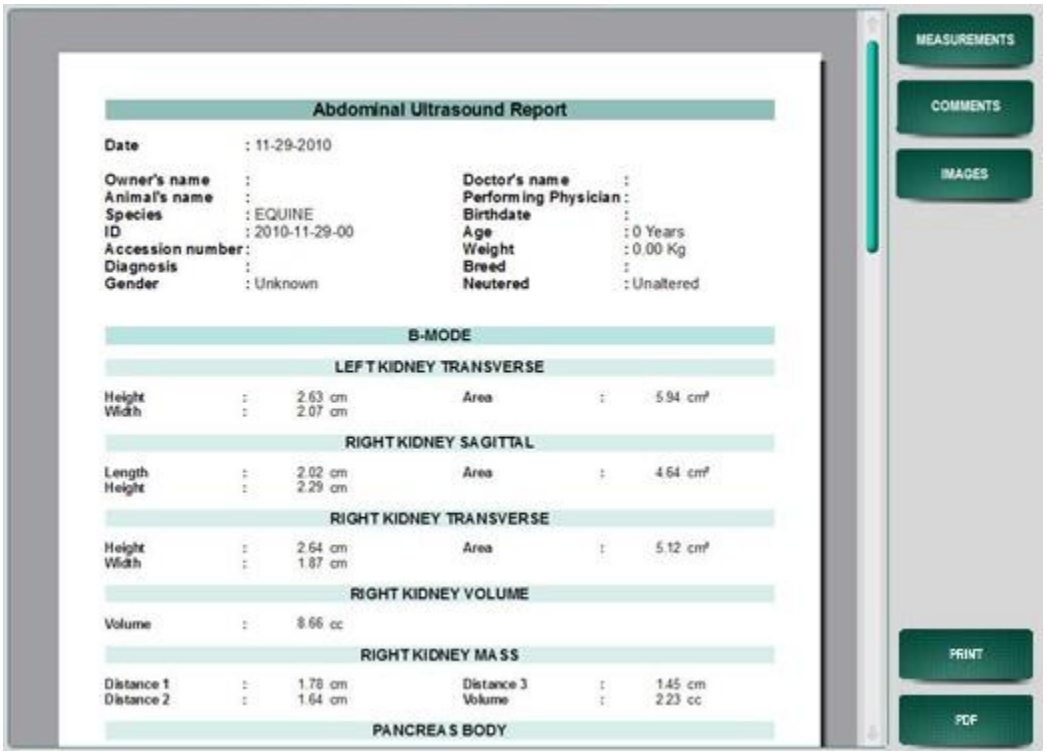
For the enabled measurements, it is possible to disable the sub-parameters or enable them and define how to measure:

- When the parameter is set to On it can be measured only if selected (not via the folder related to the main measurement).
- When the parameter is set to Off, the parameter is excluded from the measurement.

In the same configuration page it is possible to enable the average for the measurements.

# Abdominal Report

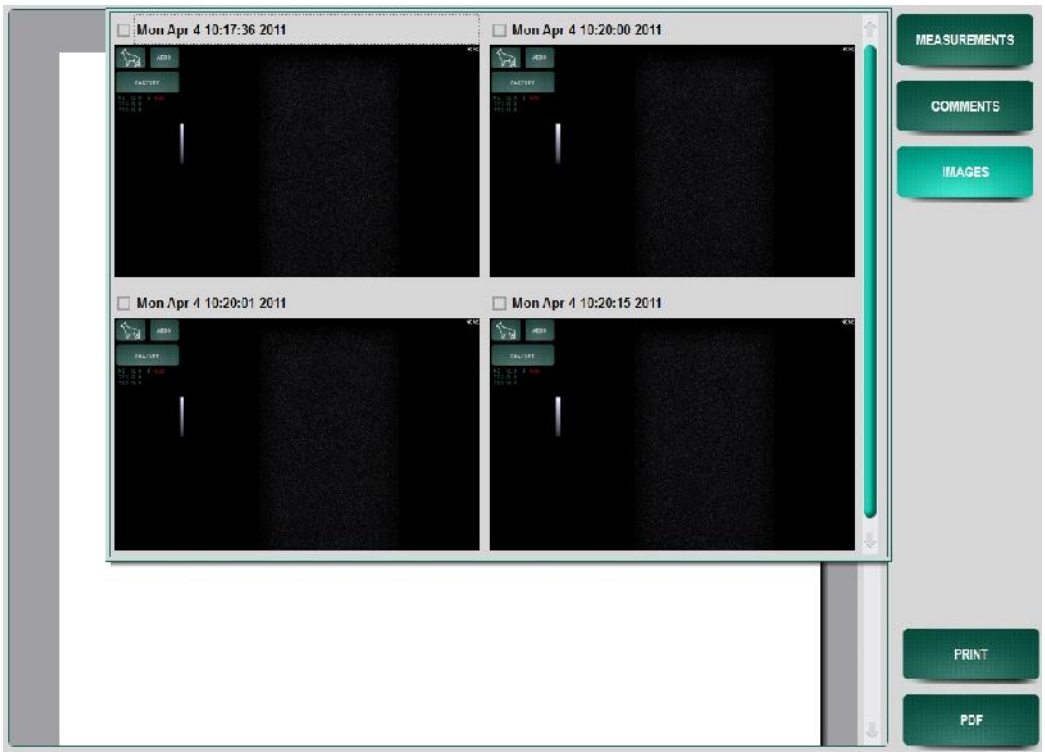
Pressing the **REPORT** tab on the control panel opens the Abdominal Report.



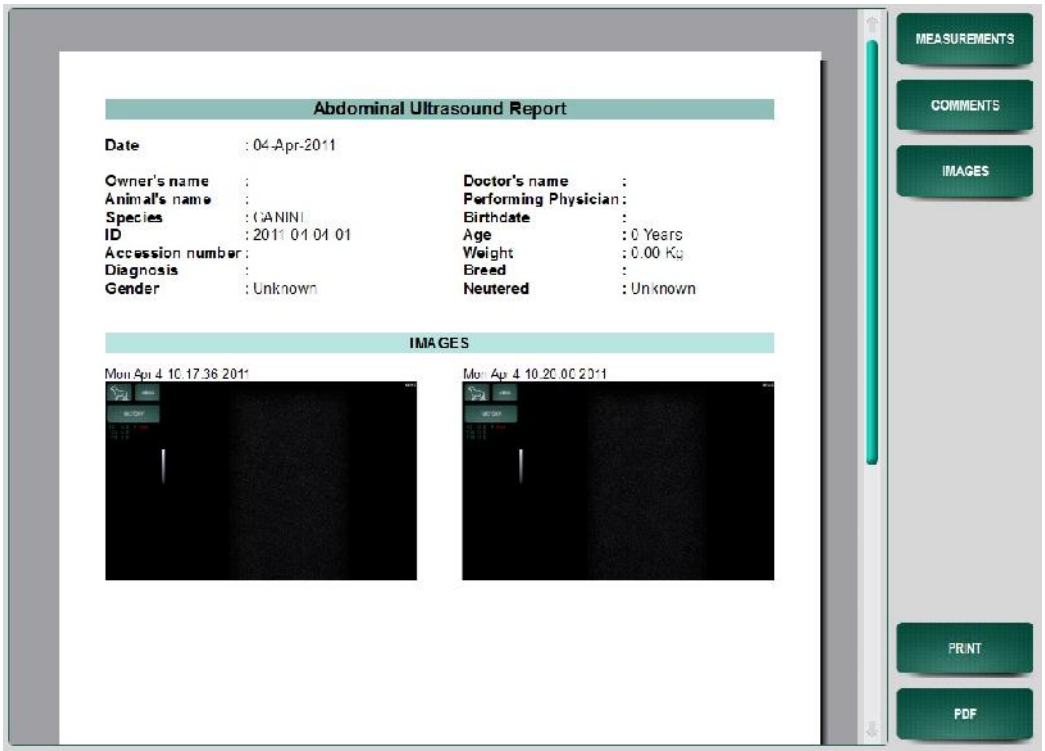

The **COMMENTS** key allows the user to add comments at the end of the report. When pressing the comments key, the comments window appears allowing data to be edited in the empty field by use of the keyboard. Also predefined comment can be added to the report by checking the involved checkbox. These comments can be defined in the **REPORT** menu of the **DISPLAY** menu in the **SYSTEM SETUP** menu

The **MEASUREMENTS** key opens a window which displays all the measurements and calculations performed. Each measurement can be selected to be shown in the report. Different sections can be selected by the corresponding tabs.

The **IMAGES** key makes it possible to add pictures to the report that were taken during the exam. In the submenu **IMAGES** the pictures can be selected by ticking their corresponding boxes.




To add the pictures to the report press **IMAGES** once more. The result can be seen in the picture below.




Examples of pages with different sections are reported hereinafter.

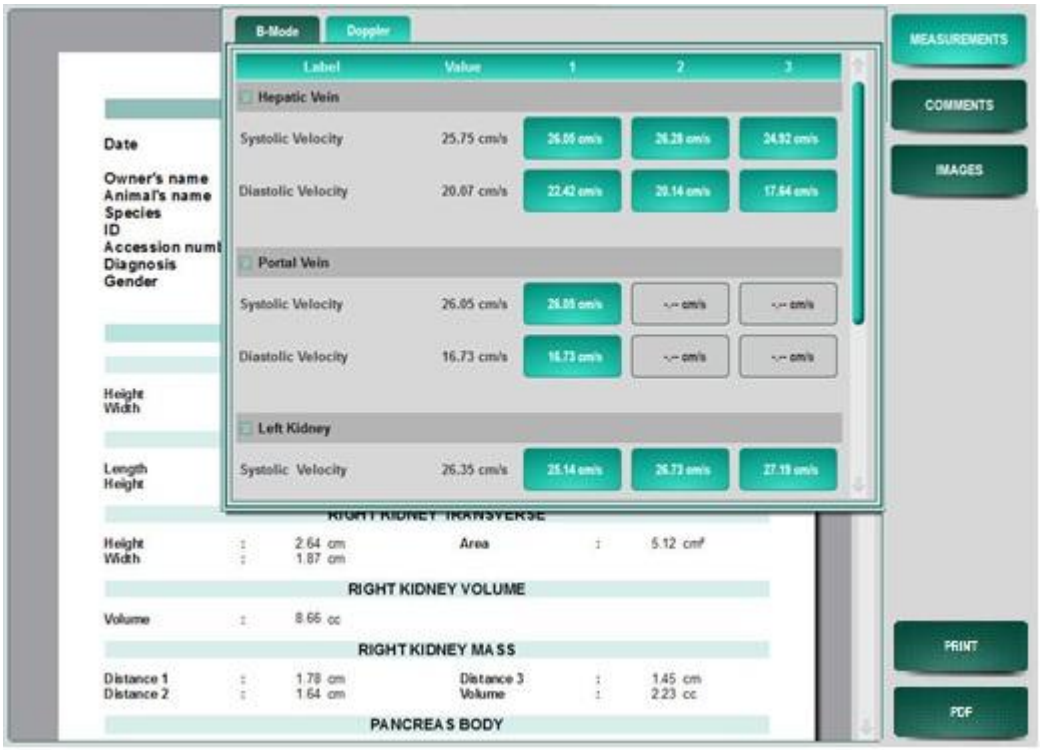
## B-Mode

The B-Mode page displays all the measurements and calculations that have been performed in B-Mode.

In case of repeated measurements, single measurements can be unchecked or checked in order to exclude or include them in the mean value calculation (if the average calculation is enabled in the setup).

## Doppler

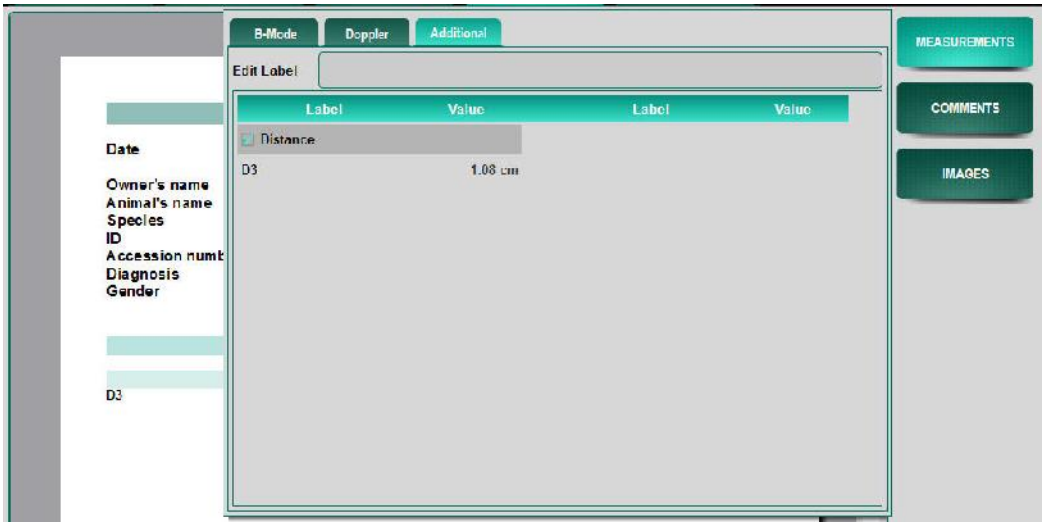
The Doppler page displays all the measurements and calculations that have been performed in Doppler mode.




In case of repeated measurements, single measurements can be unchecked or checked in order to exclude or include them in the mean value calculation (if the average calculation is enabled in the setup).

### Additional

The additional page displays all generic measurements which have been added to the report with the **ADD TO REPORT** key. In addition there is the option to rename the label of the measurement. To rename the label, select a measurement from the list and enter a new name in the "Edit Label" field and confirm with **enter.**



Chapter 4

# 4 - Equine MSK / Tendon Package

This chapter describes the Equine MSK / Tendon application package (measurements and report environments) and lists the available measurements.

*Equine species icon*

**Equine Tendon**


**Note**

This application calculation package is only available when the corresponding license is activated. Please refer to the System Configuration manual for all the options/licenses of the **MyLab** and their status.

## Equine MSK/Tendon Application

The Equine MSK/Tendon application can be activated selecting the **MSK TENDON** key from the application list, within the Equine species selected.

When the Equine MSK/Tendon application is selected, in freeze mode, press the **MEASURE** key to activate the Tendon measurements.

## Equine Tendon Measurements

### B-Mode Measurements

Pressing the **MEASURE** button makes the list of the equine tendon measurements appear on the right side of the screen.

The structure of the measurement package is based on a "core measurement"

This consists of a repetitive pattern of measurements of distance, area and distance or area ratio and distance. Two alternative measurement methods can be used:

- distance, where the position of the measurement is indicated in distance to a specific reference point;

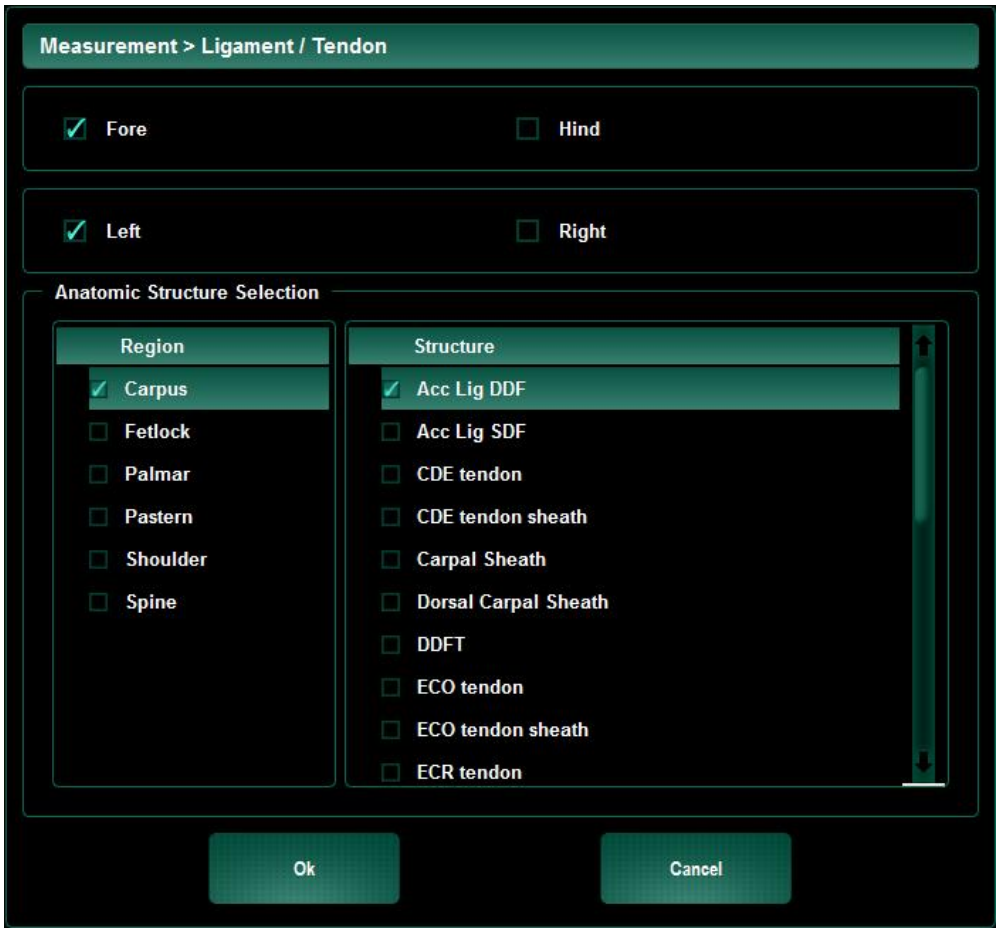
- zone, where the measurement position is indicated traditionally, in the classical manner of dividing the limbs into zones.

### Measurement items list

A selection of the limb, structure and leg zone is performed prior to starting the measurement.

This is done by pressing the **MEASURE** button, then the dedicated **LIGAMENTS/ TENDON** software key.

A dialog window appears, as indicated below:




The user can select the specific limb, the region and the structure upon which the measurement should be for performed. After that, the measurements can be performed sequentially or selectively.

A complete list of regions and structures is given below:

### Palmar Plantar MC/ MT

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| SDF (superficial digital flexor) tendon | Front, Hind | SDFT | As selected in Method |
| DDF (deep digital flexor) tendon | Front, Hind | DDFT | As selected in Method |
| Inferior Check Ligament | Front, Hind | ICL | As selected in Method |
| Accessory Ligament SDF | Front, Hind | AccLigSDF | As selected in Method |
| Accessory Ligament DDF | Front, Hind | AccLigDDF | As selected in Method |
| SL (Suspensory Ligament) Body | Front, Hind | SLBody | As selected in Method |
| SL (Suspensory Ligament) Lateral Branch | Front, Hind | SLLatBr | As selected in Method |
| SL (Suspensory Ligament) Medial Branch | Front, Hind | SLMedBr | As selected in Method |
| Superior Check Ligament | Front, Hind | SupChkLig | As selected in Method |

### Fetlock

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| SDFT – lateral | Front, Hind | LatBrSDFT | As selected in Method |
| SDFT – medial | Front, Hind | MedBrSDFT | As selected in Method |
| DDFT | Front, Hind | DDFT | As selected in Method |
| Palmar/plantar Annular ligament | Front, Hind | PAL | As selected in Method |
| SL lateral extensor branch | Front, Hind | LatExBrSL | As selected in Method |
| SL medial extensor branch | Front, Hind | MdExtBrSL | As selected in Method |
| Lateral Collateral ligament Superficial portion | Front, Hind | LCLigSup | As selected in Method |
| Lateral Collateral ligament Deep portion | Front, Hind | LCLigDeep | As selected in Method |
| Medial Collateral ligament Superficial portion | Front, Hind | MCLigSup | As selected in Method |
| Medial Collateral ligament Deep portion | Front, Hind | MCLigDeep | As selected in Method |
| Proximal Digital Annular ligament | Front, Hind | PrDgAnLig | As selected in Method |
| Straight sesamoidean ligament | Front, Hind | StrSesLig | As selected in Method |
| Oblique (middle) Distal Sesamoidean ligament-Lateral | Front, Hind | ODSLLat | As selected in Method |
| Oblique (middle) Distal Sesamoidean ligament-Medial | Front, Hind | ODSLMed | As selected in Method |
| Cruciate Distal Sesamoidean ligaments | Front, Hind | CDSL | As selected in Method |

| | | | |
|---|---|---|---|
| Digital sheath –lateral | Front, Hind | DigShLat | As selected in Method |
| Digital sheath –medial | Front, Hind | DigShMed | As selected in Method |
| Dorsal Synovial Pad | Front, Hind | DrsSynPad | As selected in Method |
| Long Digital Extensor | Front, Hind | LngDigExt | As selected in Method |
| Common Digital Extensor | Front, Hind | ComDigExt | As selected in Method |
| Lateral Digital Extensor | Front, Hind | LatDigExt | As selected in Method |

**Pastern**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| SDFT | Front, Hind | SDFT | As selected in Method |
| SDF lateral branch | Front, Hind | LatBrSDFT | As selected in Method |
| SDF medial branch | Front, Hind | MedBrSDFT | As selected in Method |
| DDFT | Front, Hind | DDFT | As selected in Method |
| DDF lateral lobe | Front, Hind | LatLDDFT | As selected in Method |
| DDF medial lobe | Front, Hind | MedLDDFT | As selected in Method |
| Distal Digital Annular ligament | Front, Hind | DistDAL | As selected in Method |
| Proximal Digital Annular ligament | Front, Hind | PrDgAnLig | As selected in Method |
| Superficial Abaxial Palmar ligament | Front, Hind | SpAbPmLig | As selected in Method |
| Deep Abaxial Palmar ligament medial | Front, Hind | DAbPLMed | As selected in Method |
| Deep Abaxial Palmar ligament lateral | Front, Hind | DAbPLLat | As selected in Method |
| Deep Axial Palmar Ligament medial | Front, Hind | DAxPLMed | As selected in Method |
| Deep Axial Palmar Ligament lateral | Front, Hind | DAxPLLAt | As selected in Method |

**Shoulder**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| Bicipital Tendon median lobe | Front | BicTMedL | As selected in Method |
| Bicipital Tendon lateral lobe | Front | BicTLatL | As selected in Method |
| Bicipital bursa | Front | BicBursa | As selected in Method |
| Transverse Humeral Ligament | Front | TRSVHumL | As selected in Method |

**Carpus**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| Extensor Carpi Radialis (ECR) tendon | Front | ECRT | As selected in Method |
| Extensor Carpi Radialis (ECR) tendon sheath | Front | ECRTSh | As selected in Method |
| Common Digital Extensor (CDE) tendon | Front | CDET | As selected in Method |

| | | | |
|---|---|---|---|
| Common Digital Extensor (CDE) tendon sheath | Front | CDETSh | As selected in Method |
| Lateral Digital Extensor (LDE) tendon | Front | LDET | As selected in Method |
| Lateral Digital Extensor (LDE) tendon sheath | Front | LDETSh | As selected in Method |
| Extensor Carpi Oblique (ECO) tendon | Front | ECOT | As selected in Method |
| Extensor Carpi Oblique (ECO) tendon sheath | Front | ECOTSh | As selected in Method |
| Ulnaris Lateralis tendon | Front | ULT | As selected in Method |
| Ulnaris Lateralis tendon sheath | Front | ULTSh | As selected in Method |
| Carpal Sheath | Front | CarpSh | As selected in Method |
| SDFT | Front | SDFT | As selected in Method |
| DDFT | Front | DDFT | As selected in Method |
| Dorsal Carpal Sheath | Front | DCSh | As selected in Method |
| Acc Lig DDF | Front | AccDigDDF | As selected in Method |
| ICL | Front | ICL | As selected in Method |
| Acc Lig SDF | Front | AccDigSDF | As selected in Method |
| Superior Check Ligament | Front | SupChLig | As selected in Method |
| Medial Collateral ligament | Front | MedColLig | As selected in Method |
| Lateral Collateral ligament | Front | LatColLig | As selected in Method |

**Tarsus**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| Gastrocnemius Tendon | Hind | GastTend | As selected in Method |
| DDFT | Hind | DDFT | As selected in Method |
| SDFT | Hind | SDFT | As selected in Method |
| Long Plantar ligament | Hind | LgPLLig | As selected in Method |
| Peroneus Tertius tendon | Hind | PerTerT | As selected in Method |
| Long Digital Extensor tendon | Hind | LongDigET | As selected in Method |
| Tibialis cranialis tendon | Hind | TibCrTend | As selected in Method |
| Cunean tendon (medial branch of tibialis cranialis) | Hind | CunTendon | As selected in Method |
| Tarsal Sheath | Hind | TarsalSh | As selected in Method |
| Calcaneal bursa (between gastrocnemius and SDF) | Hind | CalcBrs | As selected in Method |
| Gastrocnemius bursa (between gastrocnemius and tuber) | Hind | GastBrs | As selected in Method |
| Superficial bursa (between skin and SDF) | Hind | SupBrs | As selected in Method |
| Cunean tendon bursa | Hind | CunTndBrs | As selected in Method |
| Medial Collateral ligament | Hind | MedColLig | As selected in Method |
| Lateral Collateral ligament | Hind | LatColLig | As selected in Method |
| Short Medial Collateral ligament | Hind | ShMdClLig | As selected in Method |

| | | | |
|---|---|---|---|
| Long Medial Collateral ligament | Hind | LgMdClLig | As selected in Method |
| Short Lateral Collateral ligament | Hind | ShLtClLig | As selected in Method |
| Long Lateral Collateral ligament | Hind | LgLtClLig | As selected in Method |

**Spine**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| Atlantal Bursa (between nuchal ligament and atlas) | Front | AtBursa | As selected in Method |
| Supraspinous Bursa (between supraspinous ligament and underlying proximal thoracic vertebrae) | Front | SupBursa | As selected in Method |
| Supraspinous Ligament | Front | SupLig | As selected in Method |
| Interspinous Ligament | Front | IntLig | As selected in Method |
| Articular Facet | Front | ArtFacet | As selected in Method |

**Stifle**

| Parameter | Selectable in | Label | Measure |
|---|---|---|---|
| Collateral ligament- lateral | Hind | LatColLig | As selected in Method |
| Collateral ligament-medial | Hind | MedColLig | As selected in Method |
| Meniscus-lateral | Hind | MenLat | As selected in Method |
| Meniscus-medial | Hind | MenMed | As selected in Method |
| Cranial cruciate ligament | Hind | CrCrucLig | As selected in Method |
| Caudal cruciate ligament | Hind | CaCrucLig | As selected in Method |
| Middle patellar ligament | Hind | MidPatLig | As selected in Method |
| Lateral patellar ligament | Hind | LatPatLig | As selected in Method |
| Medial patellar ligament | Hind | MedPatLig | As selected in Method |
| Lateral femoropatellar ligament | Hind | LFemPatLg | As selected in Method |
| Medial femoropatellar ligament | Hind | MFemPatLg | As selected in Method |

The specific measurement can then be performed.

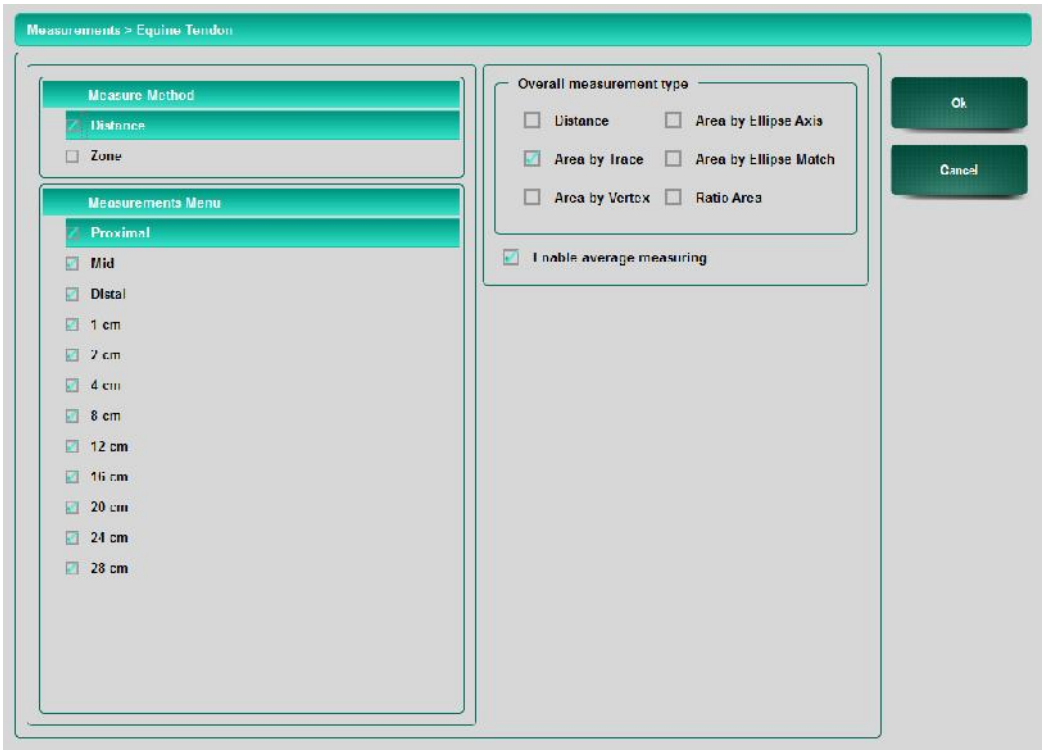
The specific selected limb, zone and region will be indicated on the left side of the screen, as reference, alongside the measurements.

An example is indicated in the picture below:


## Setup

The equine tendon measurement package can be configured via the **SETTINGS - MENU** – **MEASUREMENTS & ANALYSIS** – **TENDON**.

The following page appears:



In the "Measure Method" list, the user can choose between "Distance Method" or "Zone Method"

## DISTANCE METHOD

| LABEL |
|---|
| Proximal |
| Mid |
| Distal |
| 1 cm |
| 2 cm |
| 4 cm |
| 8 cm |
| 12 cm |
| 16 cm |
| 20 cm |
| 24 cm |
| 28 cm |

## ZONE METHOD

| LABEL |
|---|
| Region 1 |
| Region 1A |
| Region 1B |
| Region 2 |
| Region 2A |
| Region 2B |
| Region 3 |
| Region 3A |
| Region 3B |
| Region 4 |
| Region 4A |
| Region 4B |
| Region P1a |
| Region P1b |
| Region P1c |
| Region P1d |

"Overall measurement type" will select which type of actual measurements will be performed.

For each selection, the following measurements can be performed:

- for "Distance" – 3 distance measurements

- for "Tr-Area" – 2 area measurements (trace method) and 1 distance measurement

- for "Ax-Area" – 2 area measurements (ellipse method) and 1 distance measurement

- for "A-Ratio" – 1 area ratio measurement (trace method) and 1 distance measurement

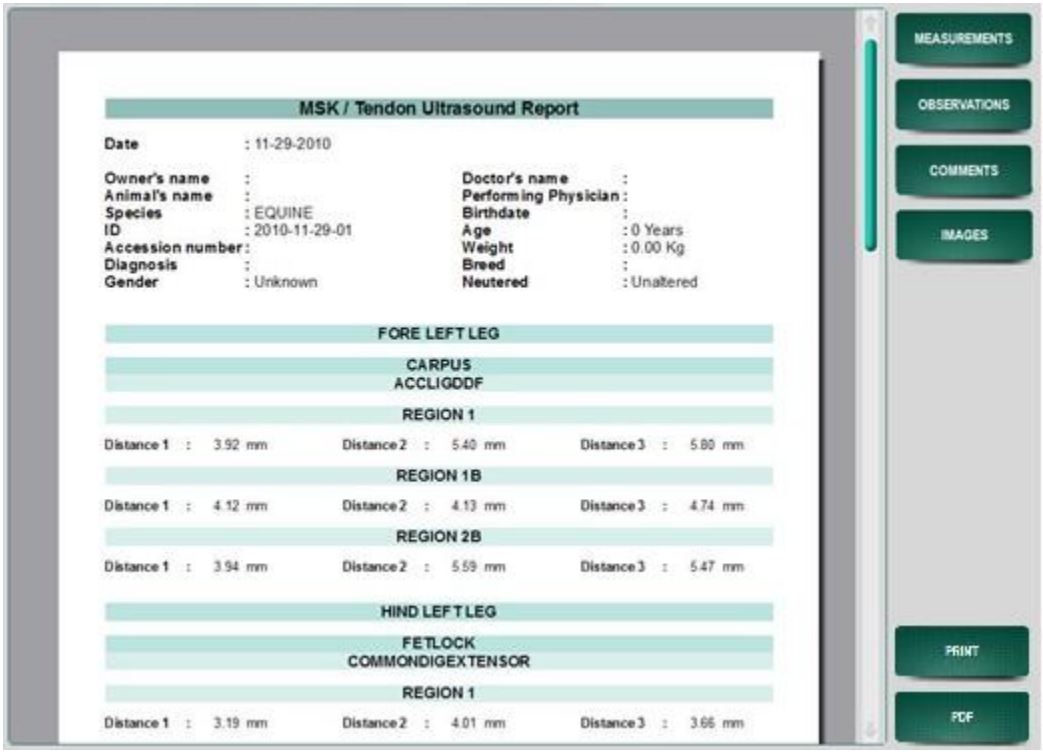
- for "E-Ratio" – 1 area ratio measurement (ellipse method) and 1 distance measurement

In the "Measurement Menu", the user can select which of the predefined labels will be shown in the measurement menu ( activated by pressing the MEASURE button).

By doing this, the number of typical measurements can be tailored to individual preferences.

## MSK / Tendon Report

Pressing the **REPORT** tab on the control panel opens the MSK / Tendon Report.



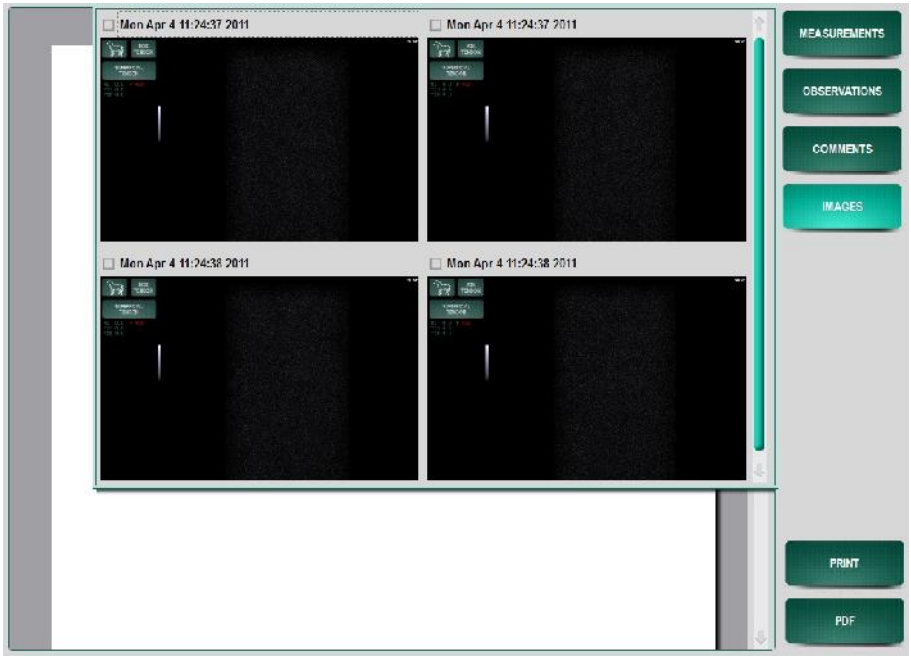

The **COMMENTS** key allows the user to add comments at the end of the report. When pressing the comments key, the comments window appears allowing data to be edited in the empty field by use of the keyboard. Also predefined comment can be added to the report by checking the involved checkbox. These comments can be defined in the **REPORT** menu of the **DISPLAY** menu in the **SYSTEM SETUP** menu

The **OBSERVATIONS** key gives the opportunity for quick and easy reporting of general characteristics observed during the examination.

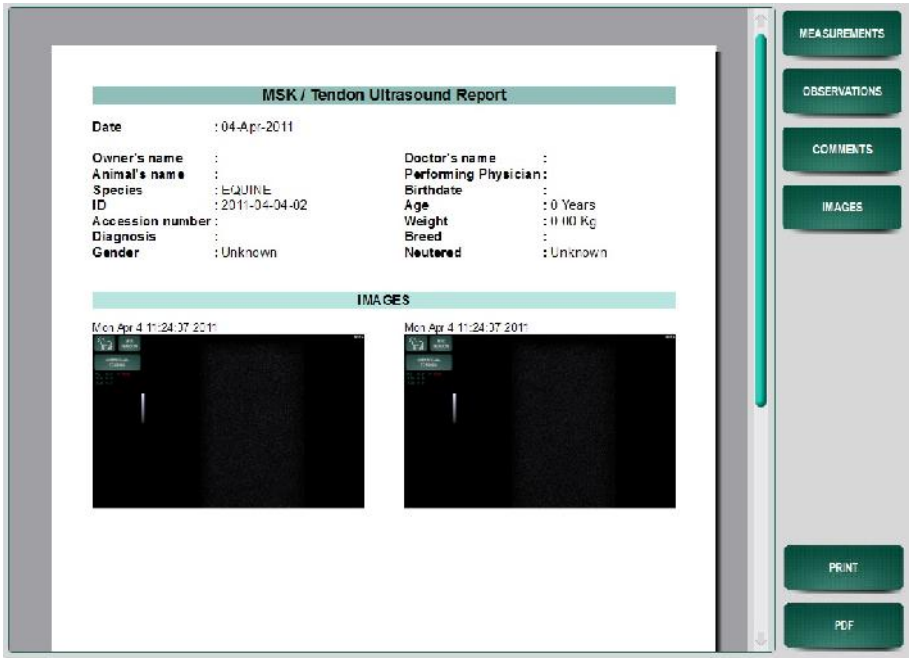
The **MEASUREMENTS** key opens a window which displays all the measurements and calculations performed. Each measurement can be selected to be shown in the report. Different sections, representing different legs, can be selected by the

corresponding tabs. The additional page displays all generic measurements which have been added to the report with the **ADD TO REPORT** key. In addition there is the option to rename the label of the measurement. To rename the label, select a measurement from the list and enter a new name in the "Edit Label" field and confirm with **enter.**

The **IMAGES** key makes it possible to add pictures to the report that were taken during the exam. In the submenu **IMAGES** the pictures can be selected by ticking their corresponding boxes.




To add the pictures to the report press **IMAGES** once more. The result can be seen in the picture below.



Chapter 5

# 5 - Reproductive Calculation Packages

In this chapter the application package for Reproductive Calculation is described.

**Note**

This application calculation package is only available for farm animals (porcine, ovine and llama) when the corresponding license is activated. Please refer to the System Configuration manual for all the options/licenses of the **MyLab** and their status.

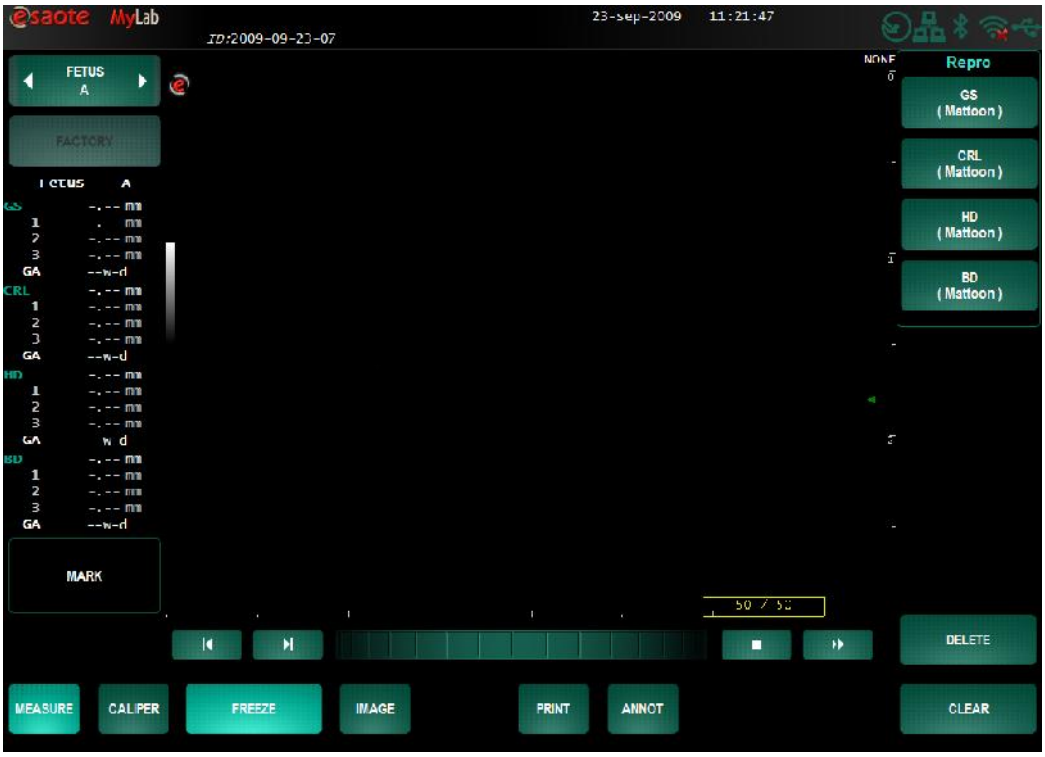
| Reproductive icon |
| --- |
|  |



Reproductive package includes calculation packages for large animals: equine and bovine, small animals: canine and feline and farm animals: porcine, ovine and llamas.

When Reproductive application is selected by the **REPRO** application key, pressing the **MEASURE** key opens the list of measurements on the right of the screen.

Once activated the application, the system displays the following menu:




## Reproductive Calculations in B-Mode

*Refer to "System Configuration" section for customization of veterinary reproductive calculations*

In B-mode, the user can calculate the gestational age in the following applications: Equine, Bovine, Canine and Feline. Optionally, also Farm Animals: Swine, Ovine and Llamas are provided.

### Gestational Age in Reproductive Canine Application

In Reproductive Canine application, the following parameters can be measured:

*Repro Canine Application Icon*

| Parameter | | Label | Measure |
|---|---|---|---|
| GS | Gestational Sac diameter | GS | Distance |
| CRL | Crown Rump Length | CRL | Distance |
| HD | Head Diameter | HD | Distance |
| BD | Body Diameter | BD | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

Up to 4 fetuses can be measured, either in single or compared mode.

Based on the calculated gestational age, the machine will calculate also the DBP (Days Before Parturition) value, which will appear on the first page of the report.

## Gestational Age in Reproductive Feline Application

*Repro Feline Application Icon*

In Reproductive Feline application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| HD | Head Diameter | HD | Distance |
| BD | Body Diameter | BD | Distance |

Every time a parameter is measured (with the exception of the amniotic index), the gestational age is automatically calculated.

All measurements will appear in the report.

Up to 4 fetuses can be measured, either in single or compared mode.

Based on the calculated gestational age, the machine will calculate also the DBP (Days Before Parturition) value, which will appear on the first page of the report.

**Formulas and Bibliographic References**

Equations to calculate the fetal age in canine, feline, and the number of days before parturition are indicated below:

**CANINE**

GSD FORMULA CANINE- Nyland, Mattoon
(Based on days post-luteinizing hormone (LH) surge in the female dog; valid for gestational age less than 40 days)
**Gestational Age = (6 x GSD) + 20**
GSD (in cm) = gestational sac diameter
Precision : ± 3 days

CRL FORMULA CANINE- Nyland, Mattoon
(Based on days post-luteinizing hormone (LH) surge in the female dog ; valid for gestational age less than 40 days)
**Gestational Age= (3 x CRL) + 27**
CRL (in cm) = crown – rump length
Precision : ± 3 days

HD FORMULA CANINE- Nyland, Mattoon
(Based on days post-luteinizing hormone (LH) surge in the female dog ; valid for gestational age more than 40 days)
**Gestational Age = (15 x HD) + 20**
HD (in cm) = head diameter
Precision : ± 3 days

BD FORMULA CANINE- Nyland, Mattoon
(Based on days post-luteinizing hormone (LH) surge in the female dog ; valid for gestational age more than 40 days)
**Gestational Age = (7 x BD) + 29**

BD (in cm) = body diameter
Precision : ± 3 days

DBP FORMULA CANINE- Nyland, Mattoon
(Based on 65 +/- 1 days post breeding in the dog)
**DBP = 65 – GA**
DBP (in days) = days before parturition
GA (in days) = gestational age

**FELINE**

HD FORMULA FELINE- Nyland, Mattoon
(Based on days post breeding in the cat; valid for gestational age more than 40 days)
**Gestational Age = (25 x HD) + 3**
HD (in cm) = head diameter
Precision: ± 2 days

BD FORMULA - Nyland, Mattoon
(Based on days post breeding in the cat; valid for gestational age more than 40 days)
**Gestational Age = (11 X BD) + 21**
BD (in cm) = body diameter
Precision: ± 3 days

DBP FORMULA FELINE- Nyland, Mattoon
(Based on 61 +/- 1 days post breeding in the cat)
**DBP = 61 – GA**
DBP (in days) = days before parturition
GA (in days) = gestational age

**Bibliography for reproductive canine and feline applications measurements and calculation**

The gestational age and number of days before parturition have been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| GSD CANINE | Nyland, Thomas G; Mattoon, John S – *Veterinary Diagnostic Ultrasound* – 1995 – ISBN 0-7216-2745-5 |
| CRL CANINE<br>HD CANINE<br>BD CANINE<br>HD FELINE<br>BD FELINE | England GCW, Allen WE, Porter DJ – *Studies on canine pregnancy using B-mode ultrasound: development of the conceptus and determination of the gestational age* – Journal of Small Animal Practice 1990; 31:324-329<br><br>Yeager AE, Mohammed HO, Meyers-Wallen V, et. al – *Ultrasonographic appearance of the uterus, placenta, fetus, and fetal membranes throughout accurately timed pregnancy in beagles* – American Journal of Veterinary Research – 1992; 53:342 – 351<br><br>Beck KA, Baldwin CJ, Bosu WTK – *Ultrasound prediction of parturition in the queen* – Veterinary Radiology – 1990:31:32-35) |

## Gestational Age in Reproductive Equine Application

*Repro Equine Application Icon*

In Reproductive Equine application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| GSD | Gestational Sac Diameter | GS | Distance |
| ERD | Equine Rump Diameter | ERD | Distance |
| ESD | Equine Skull Diameter | ESD | Distance |
| EED | Equine Eye ball Diameter | EED | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

**Formulas and Bibliographic References**

Equations to calculate the fetal age in equine and the number of days before parturition are indicated below:

**EQUINE**

GSD FORMULA EQUINE - Pipers

**Gestational Age = 6.6666666667 * GSD + 2.7333333333**

GSD (in cm) = Gestational Sack Diameter

Range : 0 weeks 3days // 6 weeks 0days

RUMP DIAMETER FORMULA EQUINE - Kähn

$$\textbf{Gestational Age} = 190.0 - \frac{\sqrt{144400 - \left[4 * \left(250 * ERD + 14082.5\right)\right]}}{2}$$

ERD (in mm) = Equine Rump Diameter

Range = 6 weeks 0days // 27 weeks 0days

SKULL DIAMETER FORMULA EQUINE - Kähn

$$\textbf{Gestational Age} = \sqrt{\frac{ESD}{0.0013} - 7753.8462}$$

ESD (in mm) = Equine Skull Diameter

Range = 11 weeks 2days // 30 weeks 0days

EYE BALL DIAMETER FORMULA EQUINE - Kähn

**Gestational Age = (EED / 0.14) - 5.5**

EED (in mm) = Equine Eye ball Diameter

Range : 11 weeks 2days // 47 weeks 0days

**Bibliography for reproductive equine application measurements and calculation**

The gestational age has been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| GSD EQUINE | Pipers FS, Zent W, Holder R, et al. - Ultrasonography as an adjunct to pregnancy assessment in the mare, Journal of the American Veterinary Medical Association 1984;184:. 328-334 |
| ERD EQUINE | Kähn W, Leidl W - Deutsche Tierärtztliche Wochenschrift.: 505-515, 9/1987 |
| ESD EQUINE | Kähn W, Leidl W - Deutsche Tierärtztliche Wochenschrift.: 505-515, 9/1987 |
| EED EQUINE | Kähn W, Leidl W - Deutsche Tierärtztliche Wochenschrift.: 505-515, 9/1987 |

## Gestational Age in Reproductive Bovine Application

*Repro Bovine Application Icon*

In Reproductive Equine application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| CRL | Crown Rump Length | CRL | Distance |
| SD | Bovine Skull Diameter | SD | Distance |
| TD | Bovine Trunk Diameter | TD | Distance |
| UD | Bovine Uterine Diameter | UD | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

**Formulas and Bibliographic References**

Equations to calculate the fetal age in bovine and the number of days before parturition are indicated below:

**BOVINE**

CRL FORMULA BOVINE - Kähn

**Gestational Age** $= \sqrt{(50.251256 * CRL)} + 540.70352$

CRL (in mm) = Crown-Rump Length

Range = 4 weeks 2 days // 11 weeks 4days

SKULL DIAMETER FORMULA BOVINE – Kähn

**Gestational Age** $= 26.5965583174 + \frac{SD}{0.523}$

SD (in mm) = Skull Diameter

Range = 8 weeks 4 days// 30 weeks 0 days

TRUNK DIAMETER FORMULA BOVINE -White

**Gestational Age** $= 41.152263 * \ln(TD) + 35.946502$

TD (in cm) = Trunk Diameter

Range = 9 weeks 1day // 19 weeks 4 days

UTERINE DIAMETER FORMULA BOVINE - White

**Gestational Age** $= 46.511628 * \ln(UD) + 0.5674419$

UD (in cm) = Uterine Diameter

Range = 4 w 2 // 18 w 4

**Bibliography for reproductive bovine application measurements and calculation**

The gestational age has been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| CRL BOVINE | Kähn, W. - Sonographic Fetometry in the Bovine.: 1105-1121, 1989 |
| SD BOVINE | Kähn,W; Leidl, W. - Deutsche Tierärtztliche Wochenschrift.: 505-515,9/1987 |
| TD BOVINE | White IR, Russell AJF, Wright, Whyte IK. - The Veterinary Record.:5-8, July 6, 1985 |
| UD BOVINE | |

## Gestational Age in Reproductive Porcine Application

*Repro Swine Application Icon*

In Reproductive Equine application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| HLA | Heart Long Axis | HLA | Distance |
| SLA | Stomach Long Axis | SLA | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

**Formulas and Bibliographic References**

Equations to calculate the fetal age in porcine and the number of days before parturition are indicated below:

HEART LONG AXIS FORMULA PORCINE - Fraunholz

$$\textbf{Gestational Age} = 10.0344827586 + \frac{HLA}{0.29}$$

HLA (in mm) = Heart Long Axis distance
Range = 3 weeks 0 days // 16 weeks 0 days

STOMACH LONG AXIS FORMULA PORCINE – Fraunholz

$$\textbf{Gestational Age} = 16.0263157894 + \frac{SLA}{0.38}$$

SLA (in mm) = Stomach Long Axis distance
Range = 3 weeks 0 days // 16 weeks 0 days

### Bibliography for reproductive porcine application measurements and calculation

The gestational age has been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| HLA SWINE SLA SWINE | Fraunholz, J.; Kähn, W.; Leidl, W. - Mh. Vet.-Med. 44(1989) : 425-430 |

## Gestational Age in Reproductive Ovine Application

*Repro Ovine Application Icon*

In Reproductive Equine application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| CRL | Crown Rump Length | CRL | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

### Formulas and Bibliographic References

Equations to calculate the fetal age in ovine and the number of days before parturition are indicated below:

CRL TABEL OVINE - Van den Boogard

| Diameter (mm) | Weeks |
|---|---|
| 13.3 | 4 |
| 28.3 | 5 |
| 45.0 | 6 |
| 65.0 | 7 |
| 85.0 | 8 |
| 105.0 | 9 |
| 123.3 | 10 |

### Bibliography for reproductive ovine application measurements and calculation

The gestational age has been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| CRL Ovine | van den Boogaard AEJM, Smeets FAM, Slangen FMA, Muytjens A.- Real time ultrasound pregnancy testing in ewes and estimation of fetal age - European Journal of Obstetrics & Gynecology and Reproductive Biology, Vol.22, 4,1986, 266-267 |

## Gestational Age in Reproductive Llamas Application

*Repro Llama Application Icon*

In Reproductive Equine application, the following parameters can be measured:

| Parameter | | Label | Measure |
|---|---|---|---|
| BPD | Biparietal Diameter | BPD | Distance |

Every time a parameter is measured, the gestational age is automatically calculated.

All measurements will appear in the report.

**Formulas and Bibliographic References**
Equations to calculate the fetal age in llama and the number of days before parturition are indicated below:

BIPARIETAL DIAMETER FORMULA LLAMAS - Haibel

**Gestational Age** = 18.8 + ( 3.79 * BPD )
BPD (in mm) = Biparietal Diameter
Range = 9 weeks 3 days // 33 weeks 4 days

**Bibliography for reproductive ovine application measurements and calculation**
The gestational age has been estimated based on the following bibliographic references:

| Parameter | Bibliography |
|---|---|
| BPD Llamas | Haibel, G.K. ; Fung, E.D. - Real-time biparietal diameter measurement for the prediction of gestational age in llamas, Theriogenology. 1988 Dec ;30 (6):1053-7 17087893 |

## Setup

The obstetric measurement list can be configured via the **SETTINGS – MENU - MEASUREMENTS AND ANALYSIS – REPRO**.

The Repro Setup section includes two sub-pages to configure the biometric measurements and the calculations.

## Gestational Age


Up to 6 measurements can be configured in the system.

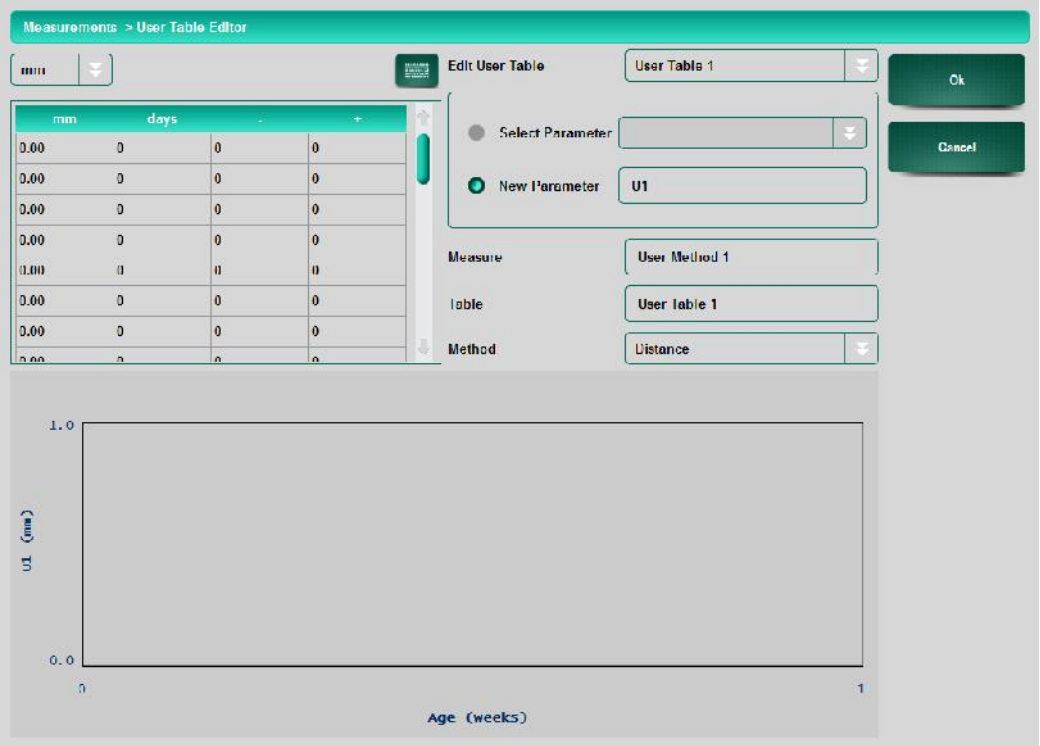
Every measurement can be configured with the following parameters:

| Item | Description |
|---|---|
| Enable | Enables the measurement. If the measurement is enabled it will be included in the list when the Measure key is pressed. |
| Average | Enables or disables the average calculation on the measurement. If Average is disabled, only one measurement will be saved in the report. In case of repeated measurements, only the last one will be saved.<br>If Average is enabled, up to three measurements can be saved in the report and used for the average calculation. |
| Measure | This pull-down menu allows the application measurements available in the system to be selected. |
| Table | This pull-down menu allows the Fetal Age table to be selected. |
| Method | This pull-down menu allows the way the measurement is performed to be selected (Area by Ellipse, Area by Trace, etc). |

*Editing User Tables*


When the Gestational Age page of Setup is displayed, the **EDIT USER TABLES** key is available on the screen.

Pressing **EDIT USER TABLES** displays the following customization environment:




This environment allows the user to define new tables for gestational age for new measurements or for existing parameters.

A maximum of 10 custom tables can be generated (selected by Edit User Table pull-down menu).

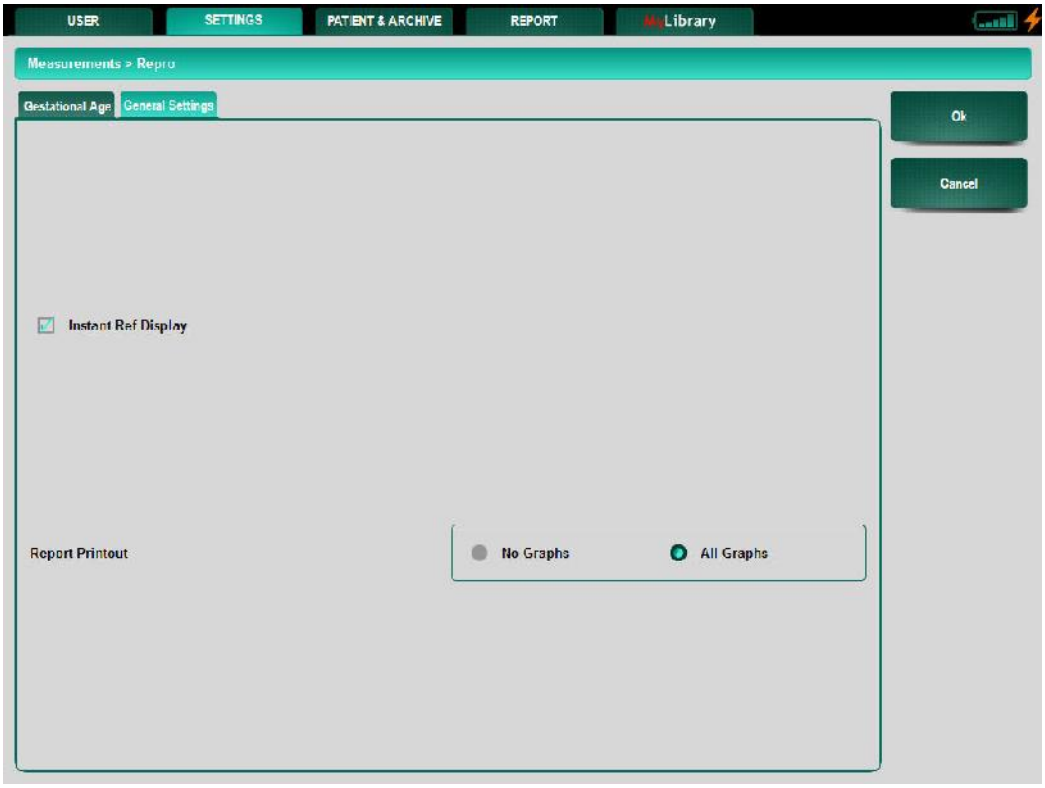
| Item | Description |
|---|---|
| Select Parameter | When Select Parameter is checked, the new custom table will be associated to an existing parameter (like BPD, TAD, etc) selected via the pull-down menu beside. In this case, values measured for these parameters will be used for calculations including the parameters. |
| New Parameter | When New Parameter is selected, the new custom table will be associated to a new parameter made by the user and not included in the OB parameter's list. |
| Measure | When New Parameter is selected, the user is allowed to edit in this field a description for the new parameter. |
| Table | In this field the user can edit the name of the new custom table. |
| Method | This pull-down menu is active only if New Parameter has been selected and allows the user to select how the new parameter has to be measured (by distance, length, area, etc).<br>If Select Parameter has been checked, this menu is not available for the user and displays the measurement method for the selected parameter. |

In the lower-left part of the screen, the user can specify the values in mm and relative GA in days with positive and negative deviations.

According to the input values, the graph is updated in the lower-right part of the window.

NOTE: the maximum number of input values that can be entered in a new table is 80.

## General settings




In this page it is possible to select:

1. Enable Instant Ref display to have the gestational age displayed when a measurement is performed.

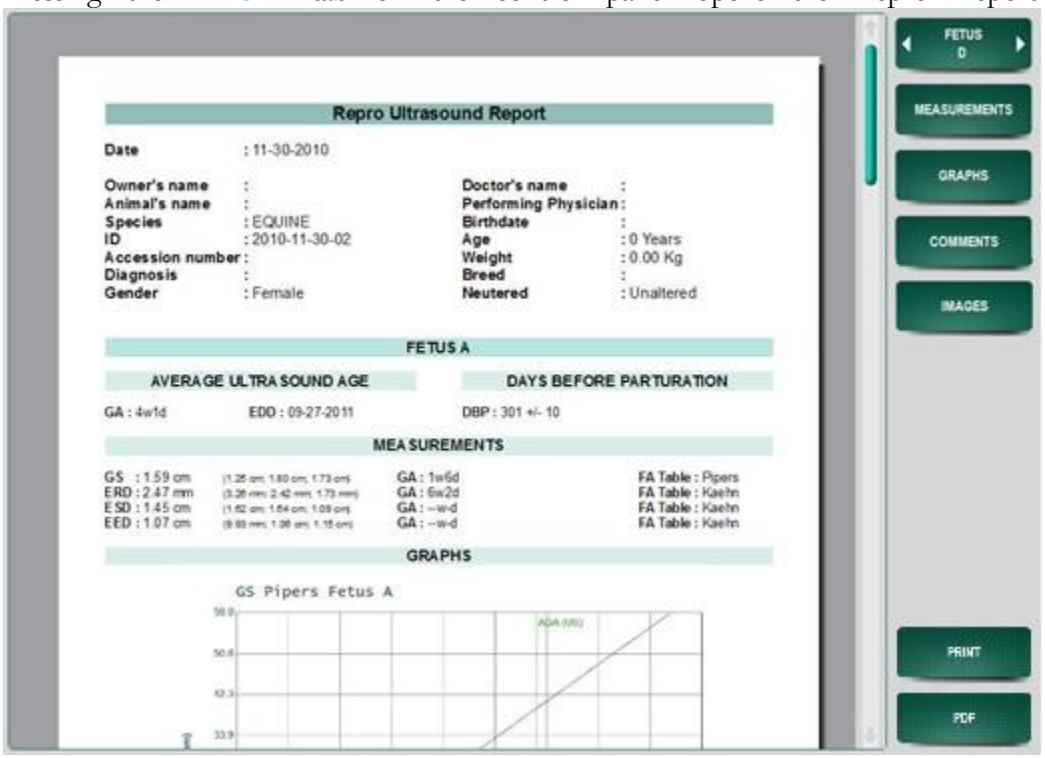
2. Enable the graphs to put in the report:

   No Graphs – no graphs will be entered in the report;

   All Graphs – all available graphs will be entered in the report;

## Reproductive Report

Pressing the **REPORT** tab on the control panel opens the Repro Report.



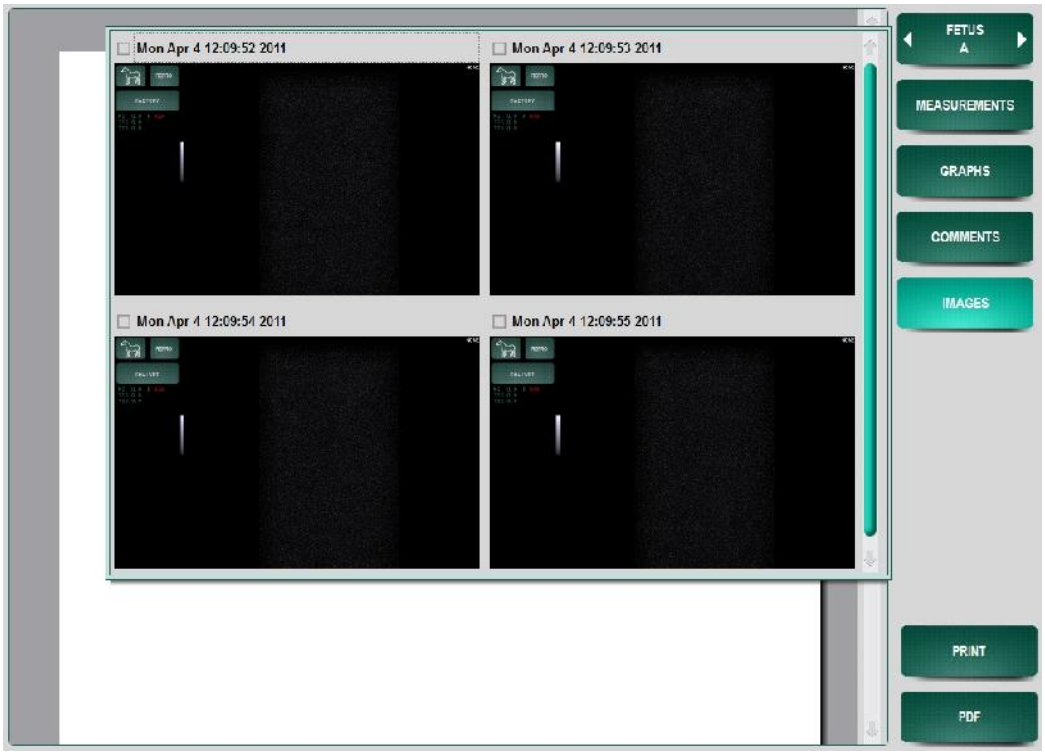

With the **FETUS** key, the report for different fetuses can be selected and configured.

The **MEASUREMENTS** key opens a window which displays all the measurements and calculations performed. Each measurement can be selected to be shown in the report. The additional page displays all generic measurements which have been added to the report with the **ADD TO REPORT** key. In addition there is the option to rename the label of the measurement. To rename the label, select a measurement from the list and enter a new name in the "Edit Label" field and confirm with **enter.**

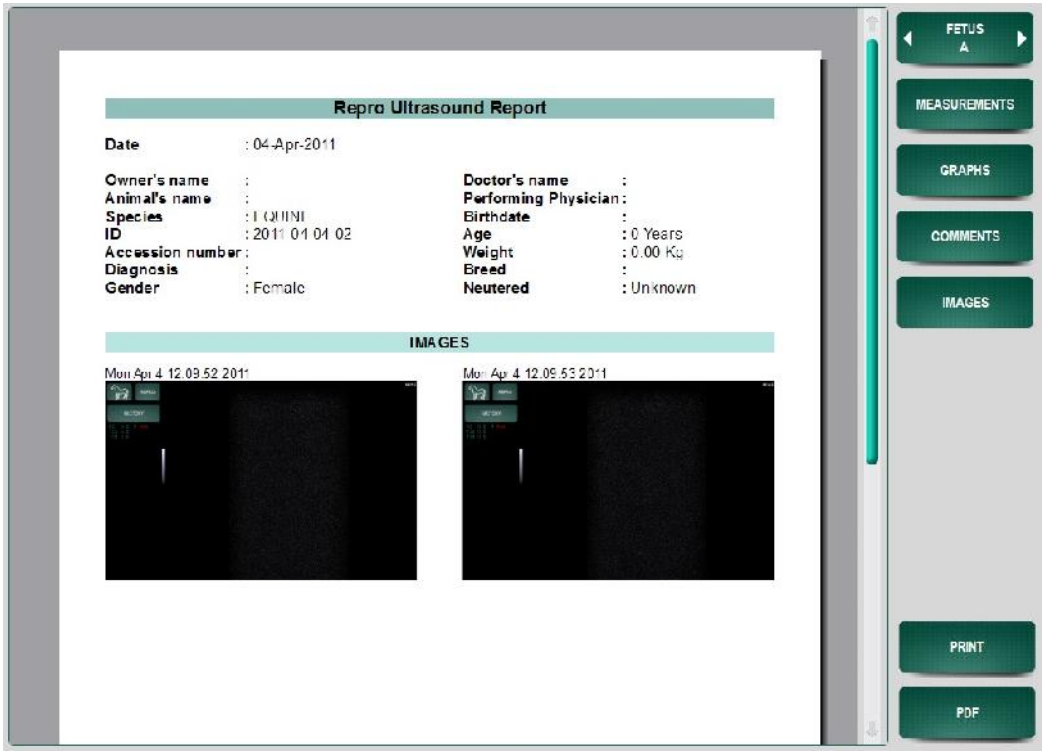
The **GRAPHS** key gives the opportunity to configure the graphs displayed in the report.

The **COMMENTS** key allows the user to add comments at the end of the report. When pressing the comments key, the comments window appears allowing data to be edited in the empty field by use of the keyboard. Also predefined comment can be added to the report by checking the involved checkbox. These comments can be defined in the **REPORT** menu of the **DISPLAY** menu in the **SYSTEM SETUP** menu

The **IMAGES** key makes it possible to add pictures to the report that were taken during the exam. In the submenu **IMAGES** the pictures can be selected by ticking their corresponding boxes.




To add the pictures to the report press **IMAGES** once more. The result can be seen in the picture below.



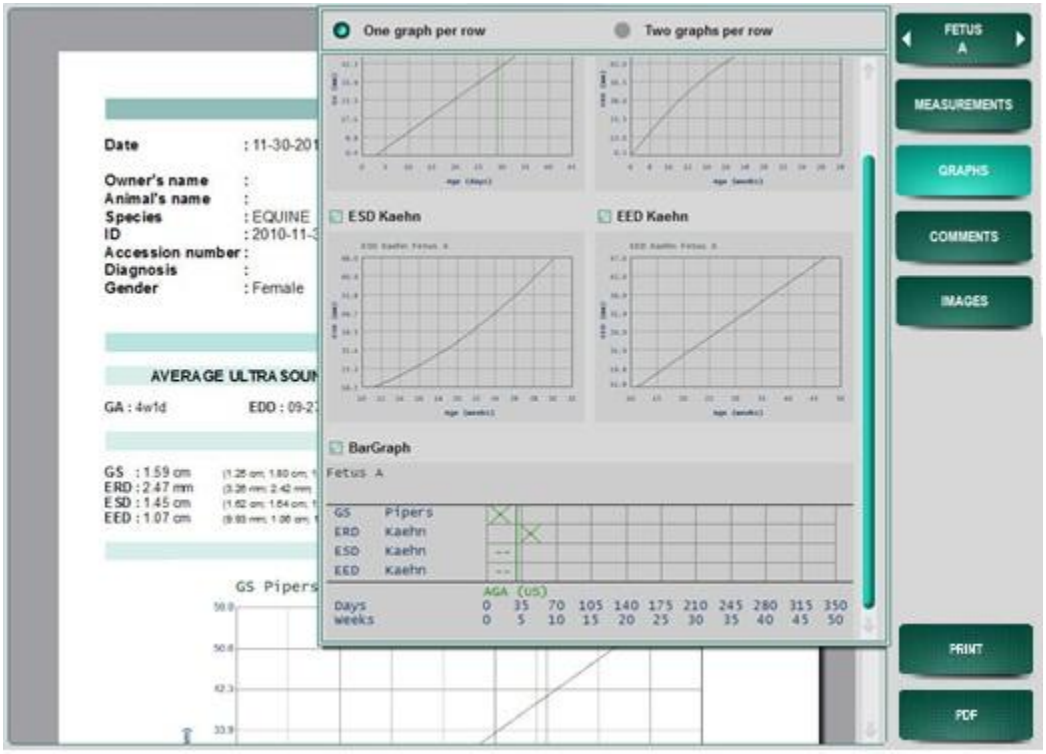
## Graphs Display

In the **GRAPHS** window both Curve and Bar graphs can be selected to be displayed.

### Bar Structure

All performed measurements are displayed in one graph. Gestational weeks and days are on the horizontal axes (one axis per measured item). In the same screen, the referenced author/table is also shown.

The GA (US) is the gestational age estimated by the performed measurements and is displayed by a vertical line. The gestational age from each single measurement is displayed by a cross. A range (present according to the selected table) is displayed by a colored rectangle around the cross.




### Curve Structure

All performed measurements are displayed in one graph. Gestational weeks and days are on the horizontal axis. The measured value is shown on the vertical axis. The referenced author/table is also shown.

The AGA (US) is the gestational age estimated by the performed measurements and is displayed by a vertical line. A range (present according to the selected table) is displayed by a lines going along the normal value according to the specific reference.

Chapter 6

# 6 - Animal Science Package

In this chapter the application package for Animal Science Calculation is described.

**Note**

This application calculation package is only available for large and farm animals (bovine, swine, ovine).

| Animal Science icon |
| --- |
|  |



The Animal Science application package contains a measurement package for measuring the hide-, fat- and loin thickness within cattle, sheep and swine and a percentage intramuscular fat calculation for cattle (Yield Grade).

The Animal Science package can be extended with the following optional license:

- Animal Science IMF license (article number: **302012100**), to activate the QUIP index and/or QUIP index Lean in Bovine species. The Animal Science IMF license also contains the Animal Science license mentioned above.

When the Animal Science application is selected by selecting the **ANIMAL SCIENCE** application key, the **MEASURE** key (in **FREEZE** mode) opens the list of measurements on the right of the screen.

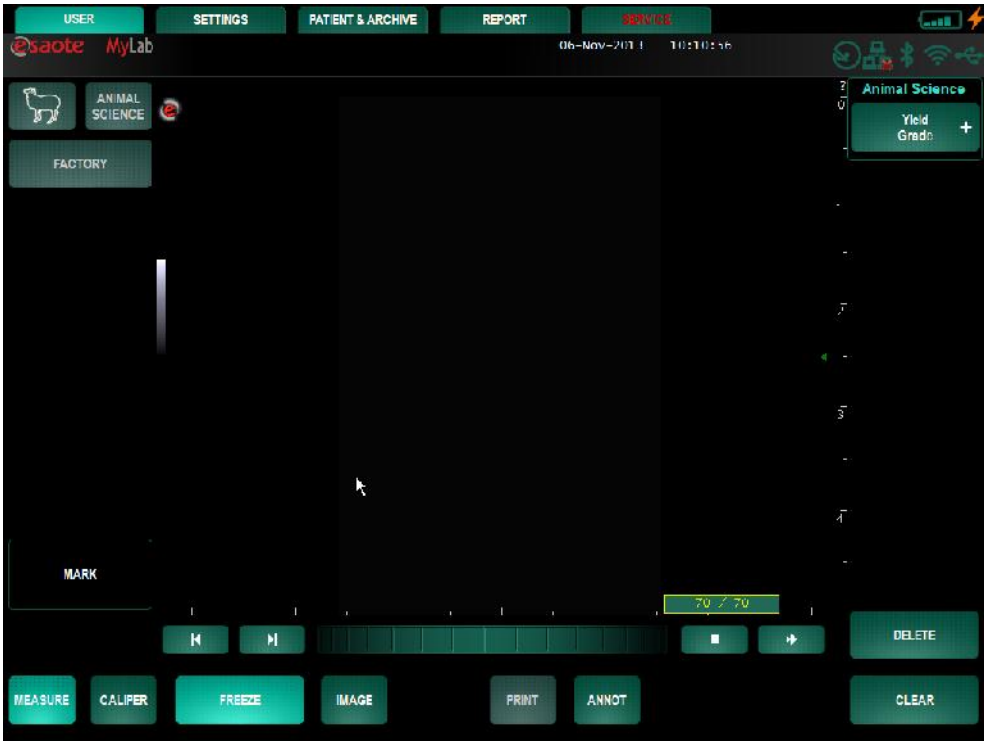
Once activated the application, depending on the activated license and the selected species, different calculation packages will be available:

- **Bovine**

*Refer to "System Configuration" section for customization of veterinary animals science calculations*


- **Porcine**

- **Ovine**




## Animal Science Calculations in B-Mode

In B-mode, depending upon the settings of the measurements (see below SETUP), the user can calculate Yield Grade, QUIP index and/or QUIP index Lean in Bovine species and Yield Grade in Porcine and Ovine species.

### Yield Grade in Bovine Animal Science Application

In Bovine Animal science application, the following parameters can be measured:

*Animal Science Application Icon*

| Parameter | | Label | Measure |
|---|---|---|---|
| HT | Hide thickness | HT | Distance |
| FT | Fat thickness | FT | Distance |
| LT | Loin thickness | LT | Distance |
| LA | Loin Area | LA | Area |
| YG | Yield grade | YG | |

Selecting the item **Hide thickness** activates the measurement of the hide layer. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Fat thickness** activates the measurement of the fat layer. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin thickness** activates the measurement of the Loin thickness. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin area** activates the Area and circumference measurement of the loin-eye. Touch the screen on the position were the measurement has to start and don't release the screen, draw a contour around the loin-eye and release the screen. The result will be displayed on the left side of the screen.

**Note**

This measurement can only be done in a transverse image of the Loin Eye.

To get the calculation of the **Yield Grade**, insert the weight of the animal in Patient &Archive page and measure the fat thickness and Loin area.

All performed measurements will appear in the report.

## Yield Grade in Porcine Animal Science Application

In Porcine Animal science application, the following parameters can be measured:

*Animal Science Application Icon*

| Parameter | | Label | Measure |
|---|---|---|---|
| FT | Fat thickness | FT | Distance |
| LT | Loin thickness | LT | Distance |
| LA | Loin Area | LA | Area |

Selecting the item **Fat thickness** activates the measurement of the fat layer. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin thickness** activates the measurement of the Loin thickness. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin area** activates the Area and circumference measurement of the loin-eye. Touch the screen on the position were the measurement has to start and don't release the screen, draw a contour around the loin-eye and release the screen. The result will be displayed on the left side of the screen.

**Note**

This measurement can only be done in a transverse image of the Loin Eye.

Based on the measured fat thickness**, Loin area** and weight (previously insert in the Patient &Archive page), the system will calculate Percent Lean (cross) which will appear on the first page of the report.

Based on the measured fat thickness, **Loin thickness** and weight (previously insert in the Patient &Archive page) , the system will calculate Percent Lean (lateral) which will appear on the first page of the report.

All performed measurements will appear in the report.

## Yield Grade in Ovine Animal Science Application

In Bovine Animal science application, the following parameters can be measured:

*Animal Science Application Icon*

| Parameter | | Label | Measure |
|---|---|---|---|
| FT | Fat thickness | FT | Distance |
| LT | Loin thickness | LT | Distance |
| LA | Loin Area | LA | Area |
| YG | Yield grade | YG | |

Selecting the item **Fat thickness** activates the measurement of the fat layer. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin thickness** activates the measurement of the Loin thickness. Touch the screen on the position were the measurement has to start, a cross will appear in the image. Touch the screen on the end position of the measurement, the result will be displayed on the left side of the screen.

Selecting the item **Loin area** activates the Area and circumference measurement of the loin-eye. Touch the screen on the position were the measurement has to start and don't release the screen, draw a contour around the loin-eye and release the screen. The result will be displayed on the left side of the screen.

**Note**

This measurement can only be done in a transverse image of the Loin Eye.

To get the calculation of the **Yield Grade** insert the weight of the animal in Patient &Archive page and measure the fat thickness and Loin area.

All performed measurements will appear in the report.

### Bibliographic References


- International Study Guide, Real-time Ulatrsound Beef cattle applications; Jerry D. Gresham PhD.

- International Study Guide, Real-time Ultrasound Swine applications, Jerry D. Gresham PhD.


## QUIP index in Bovine Animal Science Application

For the calculation of the Intramuscular Fat, two methods are available: one is according to Dr. Gresham' equation(Quip Index), one is according to Dr.Aass's equation (Quip Index Lean). (refer to bibliographic references).

In Animal science Bovine application, the following parameters can be measured:

*Animal science Bovine Application Icon*

- Quip Index

| Parameter | | Label | Measure |
|---|---|---|---|
| QUIP1 | Quip Index 1 | QI1 | |
| QUIP2 | Quip Index 2 | QI2 | |
| BOX H | Box Height | BH | cm |
| IMF | Intramuscular Fat | IMF | |
| AVIMF | Average Intarmuscular Fat | AVIMF | |

- Quip Inedx Lean

| Parameter | | Label | Measure |
|---|---|---|---|
| QUIP1 | Quip Index 1 | QI1 | |
| QUIP2 | Quip Index 2 | QI2 | |
| BOX H | Box Height | BH | cm |
| IMF L | Intramuscular Fat Lean | IMF | |
| AVIMF | Average Intarmuscular Fat | AVIMF | |

The Quip index is a single measurement based on the average gray level inside the box which is used to calculate the Intramuscular Fat.

Once selected **QUIP INDEX**/**QUIP INDEX LEAN**, touch the screen where the ROI (rectangle) has to be placed. By touching and dragging the corners of the box it is possible to change the dimension of the ROI (rectangle).

All performed measurements will appear in the report.

**Bibliography for animals science bovine and porcine applications measurements and calculation**

- International Study Guide, Real-time Ulatrsound Beef cattle applications; J.D. Gresham.
- Ultrasound prediction of intramuscular fat content in lean cattle. L.Aass, C.G. Fristedt, J.D. Gresham

## Setup

The animal science measurement list can be configured via the **SETTINGS – MENU - MEASUREMENTS AND ANALYSIS – ANIMAL SCIENCE**.

Bovine Yield Grade, Bovine quip Index, Bovine Quip Index Lean can be enabled or disabled.

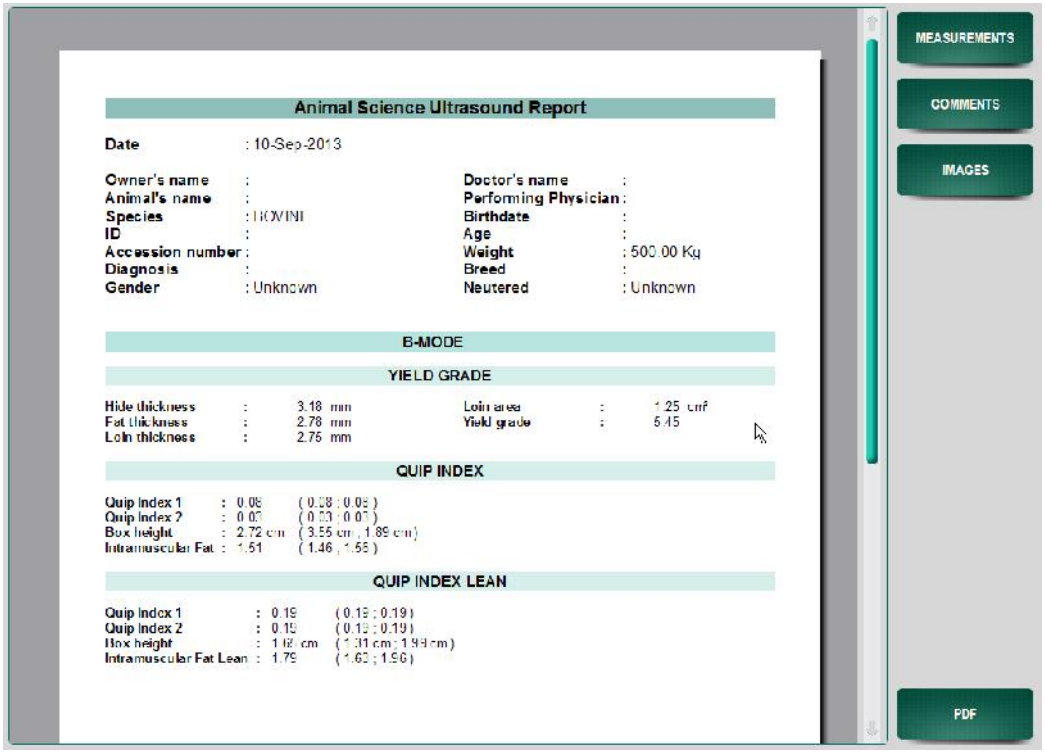

Every measurement can be configured with the following parameters:

| Item | Description |
|---|---|
| Enable | Enables the measurement. If the measurement is enabled it will be included in the list when the Measure key is pressed. |
| Average | Enables or disables the average calculation on the measurement. If Average is disabled, only one measurement will be saved in the report. In case of repeated measurements, only the last one will be saved.<br>If Average is enabled, up to three measurements can be saved in the report and used for the average calculation. |

## Animal Science Report

Pressing the **REPORT** tab on the control panel opens the Animal Science Report.

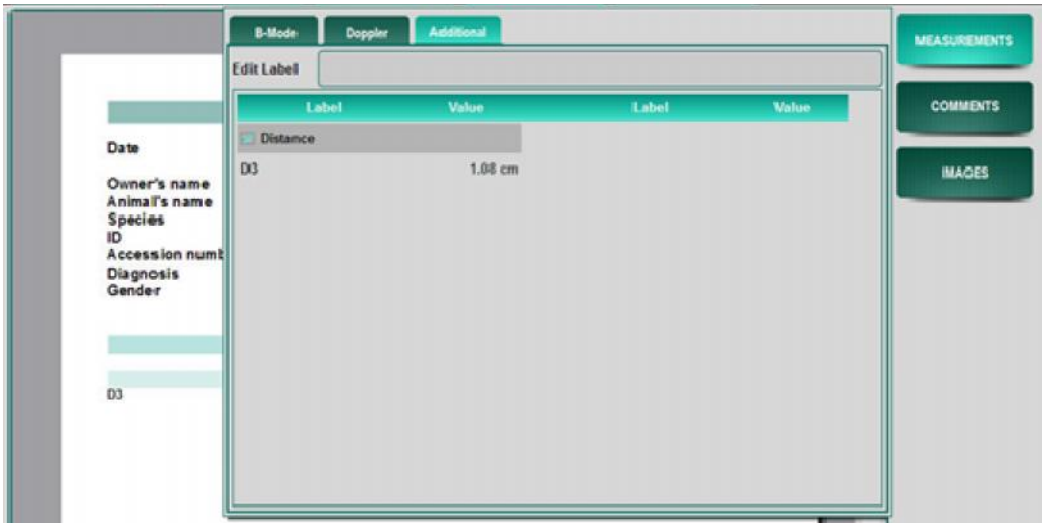
In the report the measurements of up to three images will be displayed (between brackets) and the average value of them will be displayed as first number.




*Refer to "Archive" section for Export options*

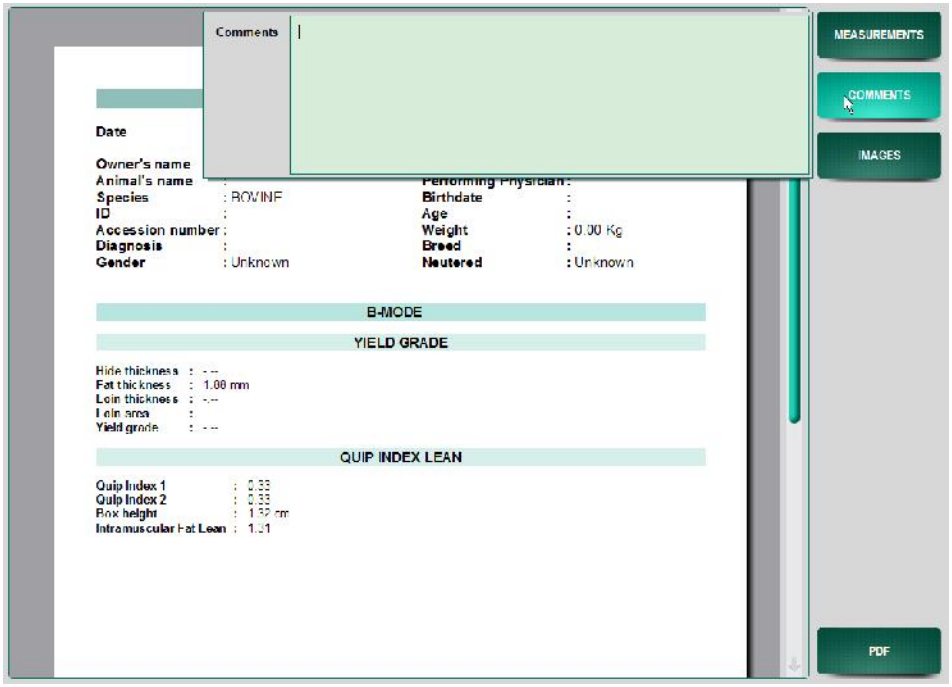
In parallel with the report, it is possible to create a file with all the measured and calculated values in a structured format. Please refer to the ARCHIVE section.

The **MEASUREMENTS** key opens a window which displays all the measurements and calculations performed. Each measurement can be selected to be shown in the report.

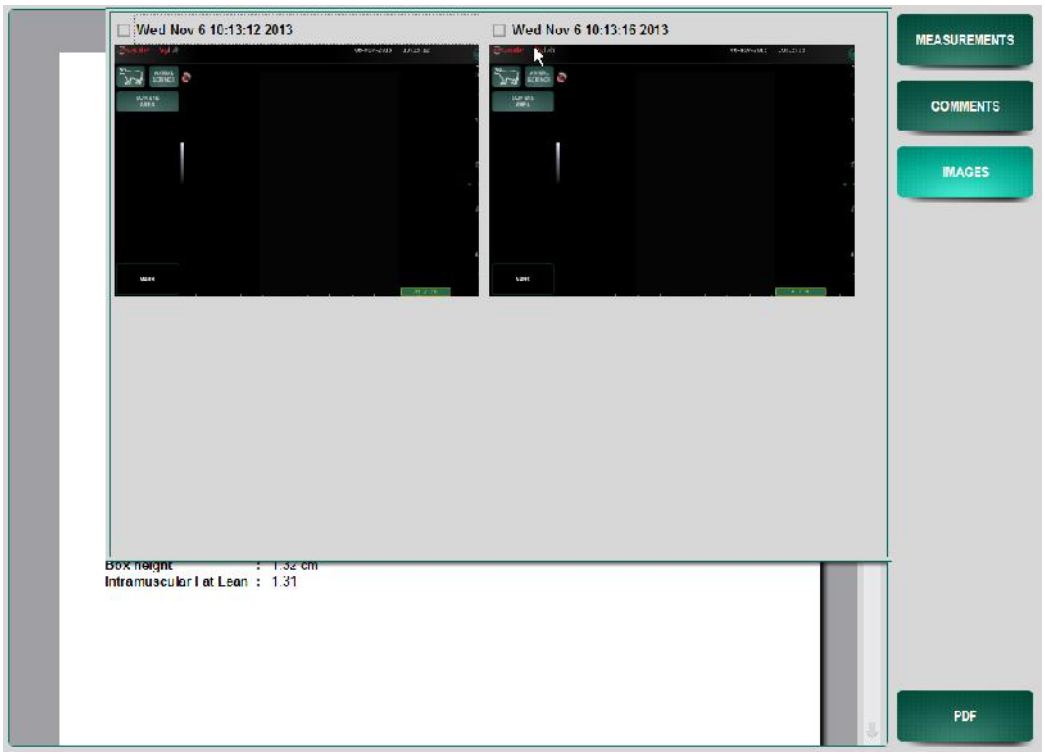



The additional page displays all generic measurements which have been added to the report with the **ADD TO REPORT** key. In addition there is the option to rename the label of the measurement. To rename the label, select a measurement from the list and enter a new name in the "Edit Label" field and confirm with **enter.**

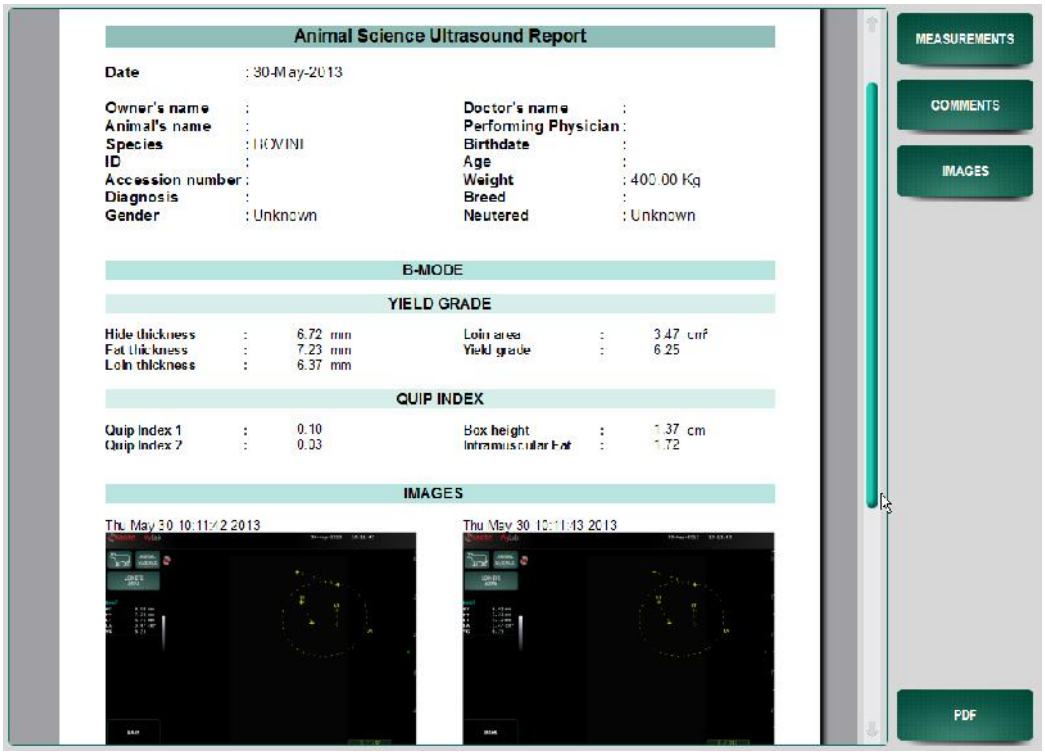
The **COMMENTS** key allows the user to add comments at the end of the report. When pressing the comments key, the comments window appears allowing data to be edited in the empty field by use of the keyboard. Also predefined comment can be added to the report by checking the involved checkbox. These comments can be defined in the **REPORT** menu of the **DISPLAY** menu in the **SYSTEM SETUP** menu



The **IMAGES** key makes it possible to add pictures to the report that were taken during the exam. In the submenu **IMAGES** the pictures can be selected by selecting their corresponding boxes.




To add the pictures to the report press **IMAGES** once more. The result can be seen in the picture below.



# Animal Science measurements, explanation

**Bovine measurements**
- Hide thickness
- Fat thickness
- Loin thickness
- Loin area
- Quip index
- Quip index Lean

**Porcine measurements**
- Fat thickness
- Loin thickness
- Loin area

**Ovine measurements**
- Fat thickness
- Loin thickness
- Loin area

**Introduction**
In order to get the best results it is important to have a good contact between probe and skin or between probe, standoff and skin. To obtain good acoustical contact, it is sometimes advised to clip the hair before scanning. If the scanning site has not been clipped, the image quality may be improved by insuring the removal of loose hair and dirt by use of a brush or metal comb. The best coupling material for scanning is vegetable oil and not scanning gel.

**Note**

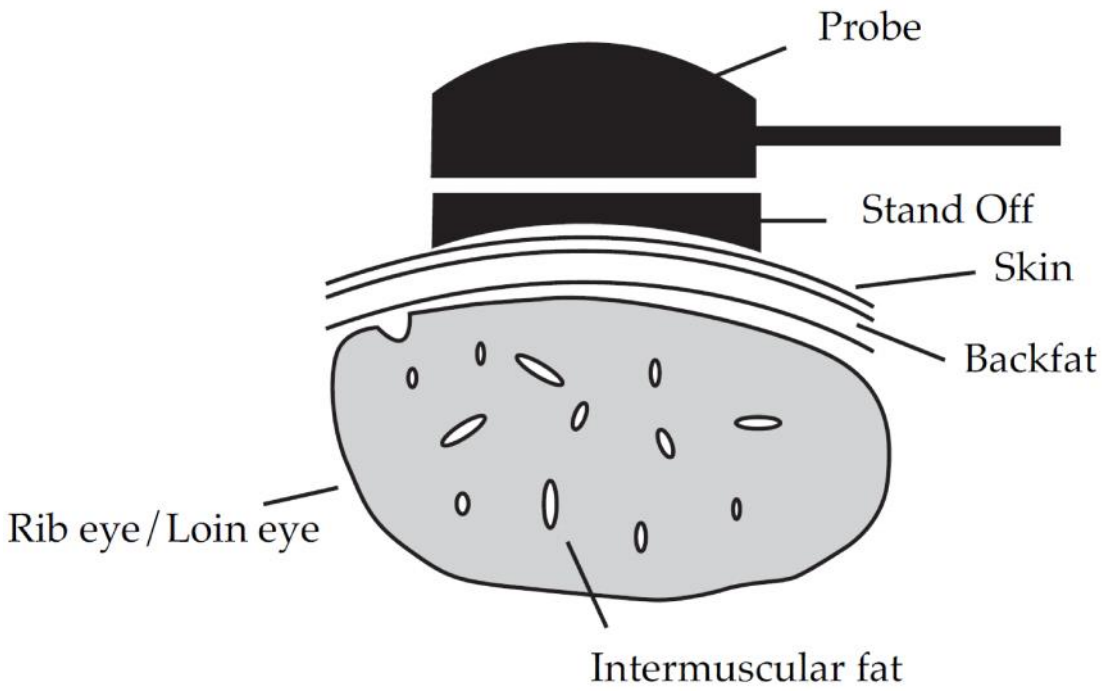
Never use mineral oil, This oil can damage the probe surface and cables.

For cross-sectional scanning a stand-off has to be attached to the ASP probe to meet the curvature of the animal.

**Note**

Esaote Europe can provide a stand-off for swine scanning and a stand-off for beef scanning.

Apply some scanning gel on the stand-off before attaching the stand-off to the ASP probe. This gel ensures acoustical contact between the probe and standoff.




*A sketch of the position of the probe on the animal is displayed above*

**Cleaning of the stand-off for swine and beef**
The stand-off should be cleaned with warm water and soap after each use and stored in its container to prevent the damage and drying out of the flexible material.

## BEEF MEASUREMENTS

The imaging of the backfat and the longissimus muscle (loin eye) is performed approximately 5 cm lateral from the spinous processes of the spine and centered over the 12th rib. Ultrasound gel or vegetable oil can be used as a couplant. With some bulls shaving of the skin is necessary to get a better contact. The probe is placed directly on the surface of the animal or a standoff path is placed bet-ween the probe and the surface of the animal.
The probe can be placed in a longitudinal or transverse plane. In the longitudinal plane only distance measurements are made and the intramuscular fat measurement in cattle. In a transverse plane a distance measurement of the Hide-, and fatlayer, the loin thickness and a circumference measurement of the Longissimus muscle are performed.
In the transverse and longitudinal image one can distinguish three distinct curved lines that will be parallel. The outer line will be the outer surface of the skin or animal hide. The middle line will be the interface between of hide and outer surface of the fat layer. The inner line will be the reflection of the interface between the inner surface of the fatlayer and the outer surface of the longissimus dorsi (loin eye) muscle.
In the transverse image the loin eye muscle should be very visible to include bioth the lateral and medial surfaces and the intercostals visible at the bottom

of the loin eye muscle.
Total fat depth is determined by measuring the distance from the outer layer of the skin to the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle.
The muscle diameter is determined by measuring the distance between the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle to the ventral surface of the longissimus muscle. The Yield Grade is the ratio between the weight andthe measurements of the fatlayer and the muscle.

**Hide thickness**
The hide thickness can be measured at the 12th and 13th rib, in a transverse or longitudinal plane.
Select the item Hide thickness and touch the screen at the outer edge of the outer line. Touch the screen again at the outer edge of the middle line. The result will be displayed on the left side of the image.

**Fat thickness**
The fat thickness can be measured at the 12th and 13th rib, either in a transverse or longitudinal plane. In the transverse plane the fat thickness is measured by selecting a site to approximate of the length of the loin eye muscle.
Select the item Fat thickness and touch the screen at the outer edge of the middle line. Touch the screen again at the outer edge of the inner line. The result will be displayed on the left side of the image.
**Loin thickness**
The Loin thickness can be measured at the 12th and 13th rib, in a transverse or longitudinal plane.

*Transverse plane*
Select the item loin thickness and touch the screen at the outer edge of loin eye muscle. Touch the screen again at the outer edge of the bottom border of the loine eye muscle. The result will be displayed on the left side of the image.

*Longitudinal plane*
Select the item loin thickness and touch the screen at the outer edge of loin eye muscle. Touch the screen again at a midpoint between the ribs. The result will be displayed on the left side of the image.

**Loin area**
The Loin area can be measured at the 12th and 13th rib, in a transverse plane. The loin area is a circumference measurement.
Select the item loin area and Touch the screen at the outer edge of loin eye Muscle and don't release the screen. Draw a contour along the outer edge of the loin eye, back to the original starting point. The result will be displayed on the left side of the image.

**Quip index/ Quip index Lean**
The Quip index measurement has to be done in a longitudinal scan of the loin eye at the 12th and 13th rib. The probe is placed in a plane parallel to the mid-line of

the animal at a point to approximate the midpoint of the loin eye muscle lateral of the spinal column.
Select the item Quip index/Quip index Lean**,** this activates the intra muscular fat measurement of the loin-eye. A rectangle will appear in the image. Touch the screen and drag the bottom line of the rectangle down and position this line just above the ribs. By touching and dragging the corners of the box it is possible to change the dimension of the rectangle.The result will be displayed on the left side of the screen.

## SWINE MEASUREMENTS

The imaging of the backfat and the longissimus muscle (loin eye) is performed approximately 5 cm lateral from the spinous processes of the spine and centered over the 10th rib. Ultrasound gel or vegetable oil is used as a couplant.
The probe is placed directly on the surface of the animal or a standoff path is placed between the probe and the surface of the animal. The probe can be placed in a longitudinal or transverse plane. In the longitudinal plane only distance measurements are made and in a transverse plane a distance measurement of the fatlayer and a circumference measurement of the Longissimus muscle.
In the image one can distinguish from top to bottom the fat, which consists of three layers, the muscle and the bowel. The first and second layer of fat are always visible on the ultrasound image. the third layer is not always present, depending on the leanness of the hog. The third layer will then present itself as a thick white band in the image.
Total Fat depth is determined by measuring the distance from the outer layer of the skin to the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle.
The muscle diameter is determined by measuring the distance between the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle to the ventral surface of the longissimus muscle. The % lean is the ratio between the measurements of the fatlayer and the muscle.

### Fat thickness

Select the item Fat thickness and touch the screen at the outer layer of the skin. Touch the screen again at the outer edge of the longissimus muscle. The result will be displayed on the left side of the image.

### Loin thickness

Select the item loin thickness and touch the screen at the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle. Touch the screen again at the ventral surface of the longissimus muscle. The result will be displayed on the left side of the image.

### Loin area

Select the item loin area and touch the screen at the outer edge of loin eye muscle and don't release the screen. Draw a contour along the outer edge of the loin eye backto the original starting point. The result will be displayed on the left side of the image.

## SHEEP MEASUREMENTS

The imaging of the backfat and the longissimus muscle (loin eye) is performed approximately 5 to 10 cm lateral from the spinous processes of the spine and centered over the 12th rib. Ultrasound gel or vegetable oil can be used as a couplant. With some bulls shaving of the skin is necessary to get a better contact. The probe is placed directly on the surface of the animal or a standoff path is placed bet-ween the probe and the surface of the animal.
The probe can be placed in a longitudinal or transverse plane. In the longitudinal plane only distance measurements are made and in a transverse plane a distance measurement of the fatlayer and a circumference measurement of the Longissimus muscle are performed. In the image one can distinguish from top to bottom the fatlayer, the muscleand the bowel.
Total fat depth is determined by measuring the distance from the outer layer of the skin to the the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle.
The muscle diameter is determined by measuring the distance between the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle to the ventral surface of the longissimus muscle. The Yield Grade is the ratio between the weight and the measurements of the fatlayer and the muscle.

**Fat thickness**
Select the item Fat thickness and touch the screen at the outer layer of the skin. Touch the screen again at the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle. The result will be displayed on the left side of the image.

**Loin thickness**
Select the item loin thickness and touch the screenat the interface of the bottom layer of fat and the dorsal surface of the longissimus muscle. Touch the screen again at the ventral surface of the longissimus muscle. The result will be displayed on the left side of the image.

**Loin area**
Select the item loin area and touch the screen at the outer edge of loin eye muscle and don't release the screen. Draw a contour along the outer edge of the loin eye backto the original starting point. The result will be displayed on the left side of the image.

Chapter 7

# 7- Measurements Accuracy

This chapter addresses measurements accuracy.

Table A reports each measurement accuracy as a function of the scales (Column **ACCURACY**) and the worst case values (Column **%**).

**TABLE A**

| Mode | Calculation | Accuracy | % |
|---|---|---|---|
| 2D | Distance(mm) | ±[1.5%xDepth(mm)+0.1]mm | ±5 |
| | Perimeter (mm) | ±[6%xDepth(mm)+1]mm | ±5 |
| | Area($mm^2$) | ±[1.5%($D_1$+$D_2$) Depth(mm)+ [0.025%xDepth(mm)$^2$+1]$mm^2$ | ±8 |
| M-Mode split and dual screen | Distance(mm) | ±[1.6%xDepth(mm)+0.1]mm | ±5 |
| | Time(s) | ±[1%xTime(s)+0.005]s | ±3 |
| Doppler full screen | Inst.velocity(m/s) | ±[2%xVR(m/s)+0.01]m/s | ±6 |
| | Time(s) | ±[1%xTime(s)+0.005]s | ±3 |
| Doppler split and dual screen | Inst.velocity(m/s) | ±[2.5%xVR(m/s)+0.01]m/s | ±8 |
| | Time | ±[1%xTime(s)+0.005]s | ±3 |

Where VR is the Doppler velocity range.

On QUAD formats the measurement accuracy could be reduced up to the half in comparison with the same measure done on the same image displayed in full screen.

**Note**

If angle correction is used, a 0.1% of computation error must be added to the accuracy of the Doppler measurements.

Worst case values are calculated with the following assumptions:

- Measurement values equal to one third of the analysis depth (ex.: with a depth of 18 cm., a distance measurement of 6 cm.).
- Ultrasound speed to be constant at 1540 m/s.

## Derived Data

Derived data accuracy can be calculated through the law of error propagation; worst case accuracy, based on the above mentioned assumptions, are reported together with the formulas in the following chapters.

To minimize the measurement uncertainty:

- optimize image quality.
- whenever possible, use the zoom function for maximum resolution.
- optimize the probe alignment with the Doppler flow.

# ARCHIVING SECTION

This section explains how to use the archiving services and is organized as follows:

- Chapter 1: Digital Archiving

  This chapter describes the digital archiving characteristics and how exams are archived.

- Chapter 2: Review of Archived Exams

  This chapter explains how to review archived exams.

- Chapter 3: Archive Menu

  This chapter explains how to use the menus of the Archive icons.

- Chapter 4: MyLabDesk

  This chapter explains what MyLabDesk is how to use it.

- Appendix A: MyLabDesk PC Requirements, Calculation Packages and Advanced Tools

  This chapter details the suggested characteristics for the MyLabDesk PC and the available calculations packages and advanced tools.

# Table of Contents

Chapter 1

# 1 - Digital Archiving

This chapter describes the digital archiving characteristics and how to archive exams.

## Characteristics

The system is equipped with an internal hard disk (local archive) onto which exams can be archived. Data can also be stored on the external supports, listed hereinafter.

*Refer to chapter 2 of the System Configuration Manual for the optimal format choice*

Data can be archived both in native format and in DICOM®[1] format (for systems equipped with a Dicom licence) and exported as BMP, PNG, JPEG and AVI files (codec Microsoft® MPEG-4 V2 or MS-Video1 compatible). Exported data cannot be reviewed by the system.

## Archive Icons

The icons identifying the archiving media are displayed on the right side of the header bar when activated.

| Hard Disk | Burner | USB medium | Wireless connectivity | Wireless connectivity | Network | DICOM |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |

A marked icon indicates that there are problems in the management of that specific archiving medium.

A crossed icon indicates that a specific archive medium is inactive or not connected.

While data is being saved, the icon corresponding to the destination medium is flashing.

[1] DICOM is a trademark of NEMA (National Electrical Manufacturers Association); Microsoft is a trademark of Microsoft Corporation.

**Note**

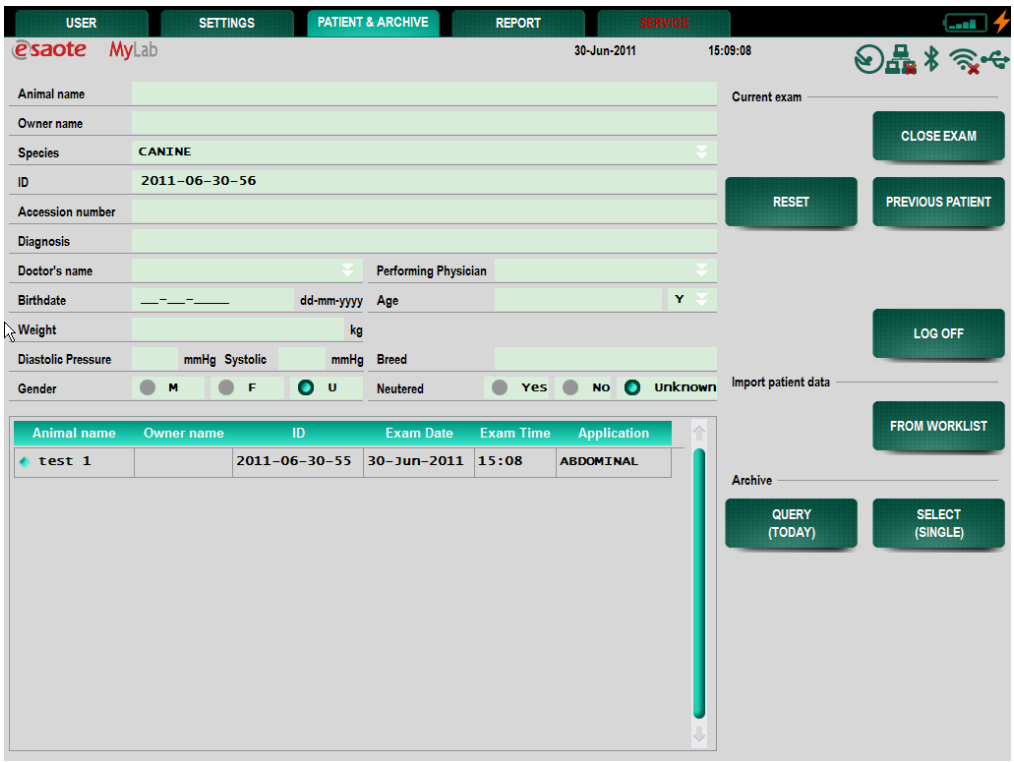
Do not switch the system off or remove the archiving medium while saving; this could cause damages to data or to the hard disk.

Before removing the archiving medium check the operation status: the medium can be removed only when the operation shows a "Completed" status.

## Archiving Exams

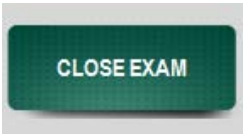
During the exam, still images and clips (in 2D and CFM formats) are saved into the system's hard disk. Still images can be saved with full (BMP format) or compressed resolution (PNG and JPEG formats); clips are compressed into MPEG format, with a minimum loss of information. For more information on the codecs used for video compression please check the System configuration part of this manual

The **PATIENT & ARCHIVE** tab displays the following window:




The three sections of the Patient & Archive screen are explained below:

### Current exam




An exam with all the data can be archived and stored on the system after pressing the **CLOSE EXAM** key. Each exam will be stored with a unique ID. Pressing the **CLOSE EXAM** button will clear out all data in the patient exam fields and a new exam can be initialized. Various archive options can be chosen and those options will be visible when the **CLOSE EXAM** key is pressed.


The **RESET** key resets all the data that is loaded or put in the editable fields.


Pressing **PREVIOUS PATIENT** key reloads the name and data of the previous patient, but will not re-open the previous exam.

Pressing the **EXPORTS** key offers the following options:



The **EXPORT** key allows the images or sequences to be exported into an external format (in BMP, PNG or JPEG for single frames and AVI for clips).


The **EXPORT.CSV** key allows the calculated values from one or more exams to be exported into a structured format.


The **COPY** key allows the user to copy the exams in native format on an external support.


The **DICOM** key allows archiving of data in DICOM format.

> **Note**
>
> The **DICOM** key is only available when the DICOM option is enabled in the system.


Pressing the **EXPORTS** key allows the user to return to the previous menu.

> **Note**
>
> Data can be made anonymous for Export and DICOM by the Archive & Export page of the System Setup in the menu.


### Import patient data

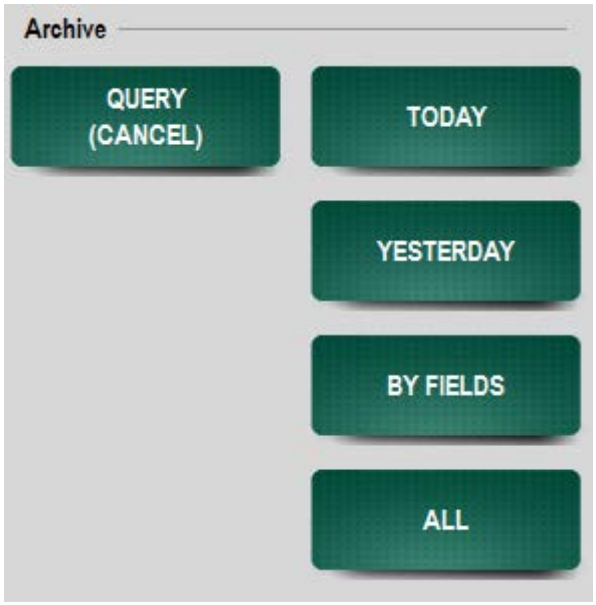
Reimports patient data from the database into the patient fields of the current exam.

> **Note**
>
> The **FROM ARCHIVE** key only appears when an exam from the list is selected and highlighted AND when not more than two exams are selected by Query.


The **FROM WORKLIST** key is used to retrieve information about patient data from the DICOM server.

### Archive


The **QUERY** key activates the search criteria for exams. A result will be visible if the criteria matches the data input. Pressing the **QUERY** key offers the following options:





Pressing the **TODAY** key will display a list of exams perfomed today.

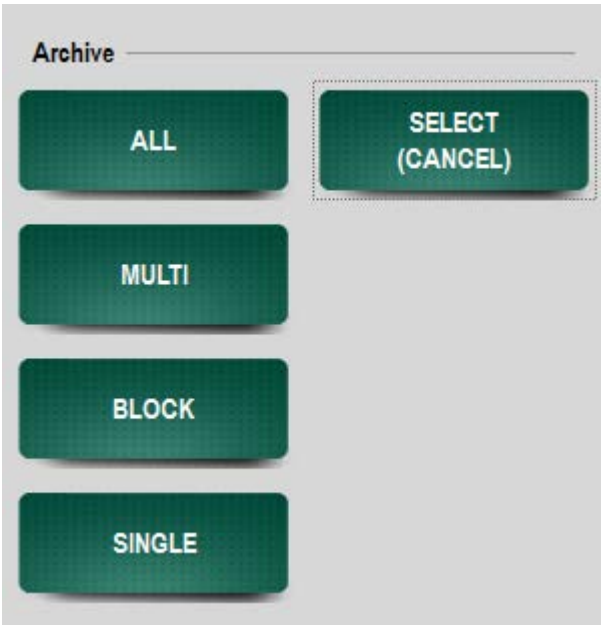

Pressing the **YESTERDAY** key will display a list of exams perfomed yesterday.


Pressing the **BY FIELDS** key will display exams as a result of the search performed in the database according to data entered in the fields (Patient Name, ID, Accession Number, Diagnosis, Referring and Performing Physician, Birthdate, Age, Weight and Height).


Pressing the **ALL** key will display all exams in the archive.


Pressing the **QUERY** key allows the user to return to the previous menu.


The **SELECT** key activates the possibility for mulitiple selection of exams. Pressing the **SELECT** key offers the following options:





Pressing the **ALL** key will select all exams in the archive.


Pressing the **MULTI** key allows multiple selection of exams by selecting a set of exams one by one in the archive.


Pressing the **BLOCK** key allows multiple selection of exams by selecting a first and last exam to highlight a set in the archive.


Pressing the **SINGLE** key will select only one exam in the archive.


Pressing the **SELECT** key allows the user to return to the previous menu.


Select the exam(s) and press the **DELETE** key to delete the selected archived exam(s).


The **REVIEW** key enables reviewing of the stored images and sequences from an archived exam.

> **Note**
>
> The **REVIEW** key only appears when an exam from the list is selected and highlighted AND when not more than two exams are selected by Query.


Pressing the **EXPORTS** key offers the following options:



The **EXPORT** key allows the images or sequences from an archived exam (selected in the list) to be exported into an external format (in BMP, PNG or JPEG for single frames and AVI for clips).


The **COPY** key allows the user to copy the selected exams in native format on an external support.


The **DICOM** key allows archiving of data in DICOM format.

**Note**

The **DICOM** key is only available when the DICOM option is enabled in the system.


Pressing the **EXPORTS** key allows the user to return to the previous menu.

**Note**

Data can be made anonymous for Export and DICOM by the Archive & Export page of the System Setup in the menu

**Note**

When the system is switched on, the system archives the last exam performed, if the machine was switched off without first closing the exam underway.

**Note**

Make sure to perform regular back-ups of the exams stored in the database. Back-ups can be made on external media.

The following media can be selected for archiving and exporting operations:

*Refer to chapter 2 of the System Configuration manual for more information about the export and archiving features*

| Medium | Archiving | Exportation |
|---|---|---|
| **Hard disk (DB)** | Yes | No |
| **CD (R and RW) (peripheral)** | Yes | Yes |
| **DVD (+R, -R, singlelayer) (peripheral)** | Yes | Yes |
| **USB medium** | Yes | Yes |
| **Network Directory** | Yes | Yes |
| **Dicom Storage SCU Server** | Yes | No |

Selection can be made using the drop-down menus.

When the exam is archived on CD or DVD in DICOM format, the Biopacs Lite[2] viewer is automatically stored on CD or DVD, allowing the user to review the exams on any PC.

CAUTION

[2] Biopacs Lite is a DICOM viewer developed by Esaote

**The system is equipped with several USB ports. Insert only one USB medium in either of the ports during data archiving or exporting.**

The exported exams are organized in folders: every exam is contained in a specific folder together with its images, clips and reports.

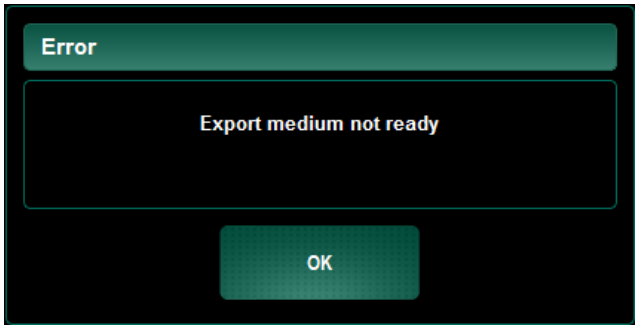
If no option is selected, all stored data is deleted.

The patient data can be inserted any time during the examination. When the patient data is edited, the whole exam (with saved images and clips) is associated and named under that patient.

## Archiving Media

### Writable CDs (CD R)

Clean disks must be used. If the CD contains data, the system will not allow it to be written on and displays the following message:




Insert an empty disk and press OK to continue. Multisession is not supported.

### Rewritable CDs (CD RW)

Rewritable CDs can be used to archive data as long as they are empty. Multisession is not supported. Read the following chapters for instructions on how to delete data from rewritable CDs.

### Double Layers DVDs

Clean disks must be used. If the DVD contains data, the system will not allow it to be written. Multisession is not supported. Insert an empty disk and press OK to continue.

### Writable DVDs

Clean disks must be used. If the DVD contains data, the system will not allow it to be written. Multisession is not supported.

### USB Keys

USB keys are managed in multi-session: data can be added to those already containing data.

### Wireless connectivity for networks

The system can only remotely control printers for printing in B&W and color. Data and images of exams can also be transferred to a network.

Chapter 2

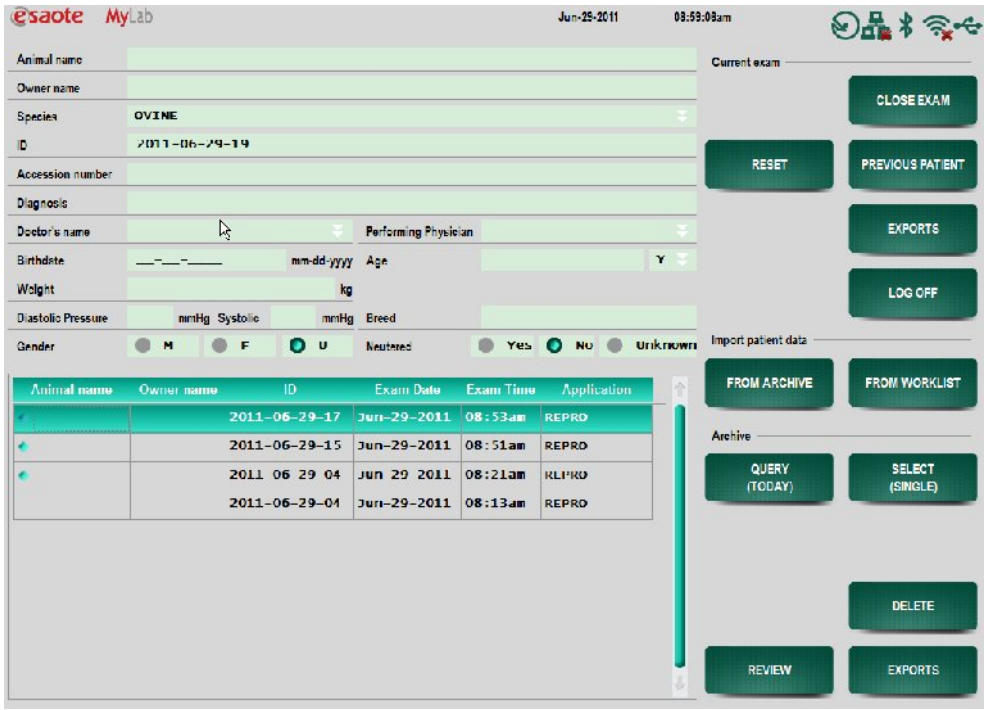
# 2 - Review of Archived Exams

This chapter explains how to review archived exams.

## Access to the Archive

Images can be reloaded for each patient and a specific exam can be reviewed.

The **PATIENT & ARCHIVE** tab displays the following window:

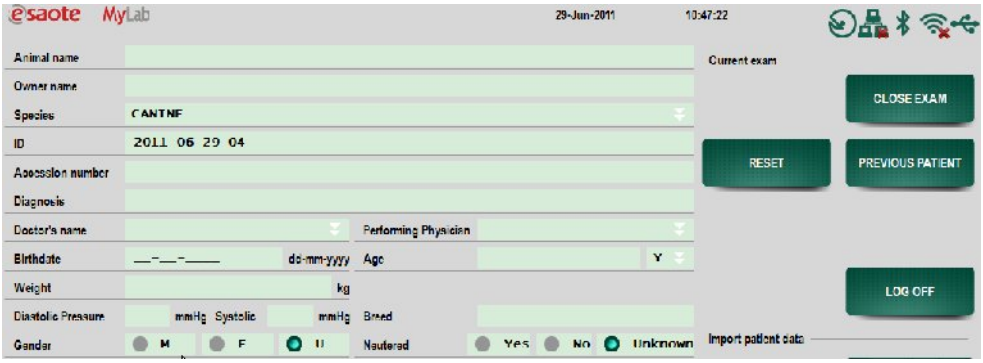



The bottom part of the window lists all the exams performed and saved in the system.

*Searching exams*

A search can be performed through the list in order to display a specific exam or a limited list of exams matching defined criteria keys.

Below is the section of the **PATIENT & ARCHIVE** window enclosing patient and exam data:




*Searching by Patient/exam data*

To define a search by patient/exam data:

- Select a field in the patient/exam area.
- The alphanumeric keyboard will then appear on screen.
- Enter the patient name or ID or other parameters to use as search key.
- Press the **QUERY** key and then choose the **BY FIELDS** key..

The exams matching with the search data key will be displayed in the bottom area.


The selection of the exam list can be performed by the **TODAY** and **YESTERDAY** keys displaying the list of exams performed the same day or the day before.

Pressing the **ALL** key will display all exams in the archive.


The **RESET** key resets the complete search procedure; the set of search criteria in the editable fields


After selecting an exam in the list, pressing the **REVIEW** key enables the reviewing of the stored images and sequences and deletion of any files that are not required.

## How to Select an Exam

Archived exams are listed in alphabetic order (if **QUERY (ALL)** is selected). Each line in the exam list encloses the following data:

- Animal name
- Owner name
- Birthdate
- Exam number (ID)
- Exam date
- Application

The exams to be reviewed can be selected by touching the line in the exam list. By pressing the button **SELECT** more buttons will appear:

- **ALL** will select all the exams in the list
- **MULTI** will make it possible to select multiple exams
- **BLOCK** will make it possible to select multiple exams in blocks (first en last in the list that has been selected and everything in between)
- **SINGLE**: selection of one exam is possible

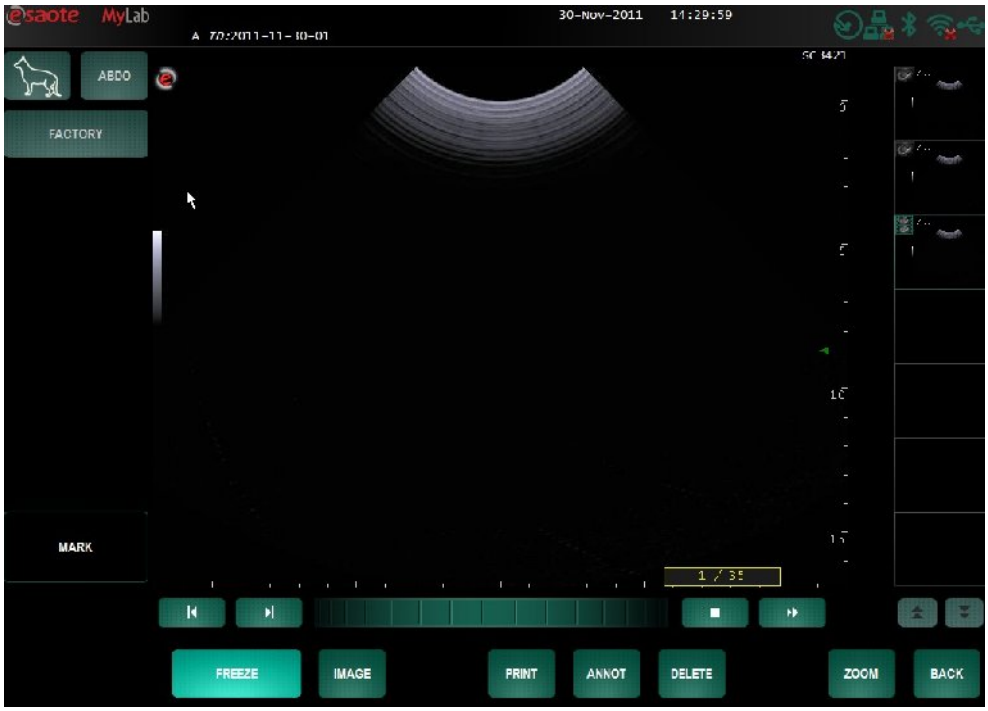
After selecting it is possible to:

- Review it
- Copy it/them in proprietary format on external memory media
- Export it/them on external memory media
- Delete it/them

## How to Review an Archived Exam

Once the exam to be reviewed is selected press **REVIEW**.

The system automatically shows the first image of the exam on the screen and the list of thumbnails corresponding to the other saved images.




By selecting the thumbnails, the correspondent images or clips will be opened and displayed on screen.

*See the "Calculations" section for taking measurements.*

Clips are played in motion: The **STOP** key de-activates the kinetic presentation and allows the sequence to be scrolled image-by-image, using the memory-scrolling bar. The **BEGIN** and **END** keys position the scroll memory cursor at the begin or end of the selected image or sequence.

Reloaded images can also be printed.

### How to Delete an Image

To delete a stored image or sequence, select the image or sequence and press the **DELETE** key.

Pressing the **BACK** button will return to the Patient & Archive environment.

Chapter 3

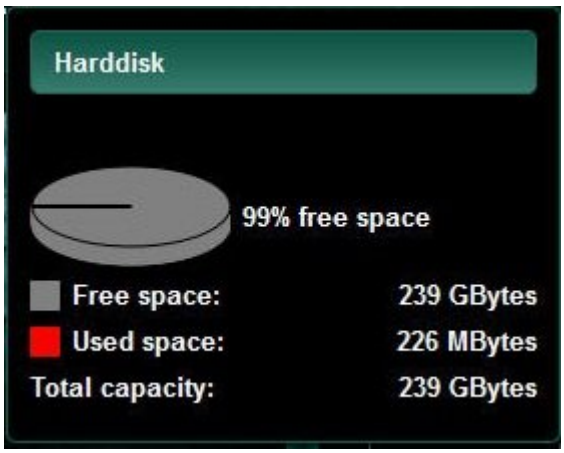
# 3 - Archive Menu

This chapter explains how to use the archive icon dialogue windows. The archive icons are located on the top right corner of the screen.

## Hard Disk

*Hard disk icon*

By pressing on the icon automatically displays the space still available in memory. A popup menu will appear like the following:




The same icon graphically indicates the free space available in the internal hard disk as shown in the table below:

| More than 20% of free space | Less than 20% of free space |
|---|---|
|  |  |

**Note**

When the free space is lower than 20%, make a copy of the archive and then delete all copied exams to free space on the hard disk.

**WARNING**

**Do not switch the unit off while executing this procedure. The hard disk could be permanently damaged.**

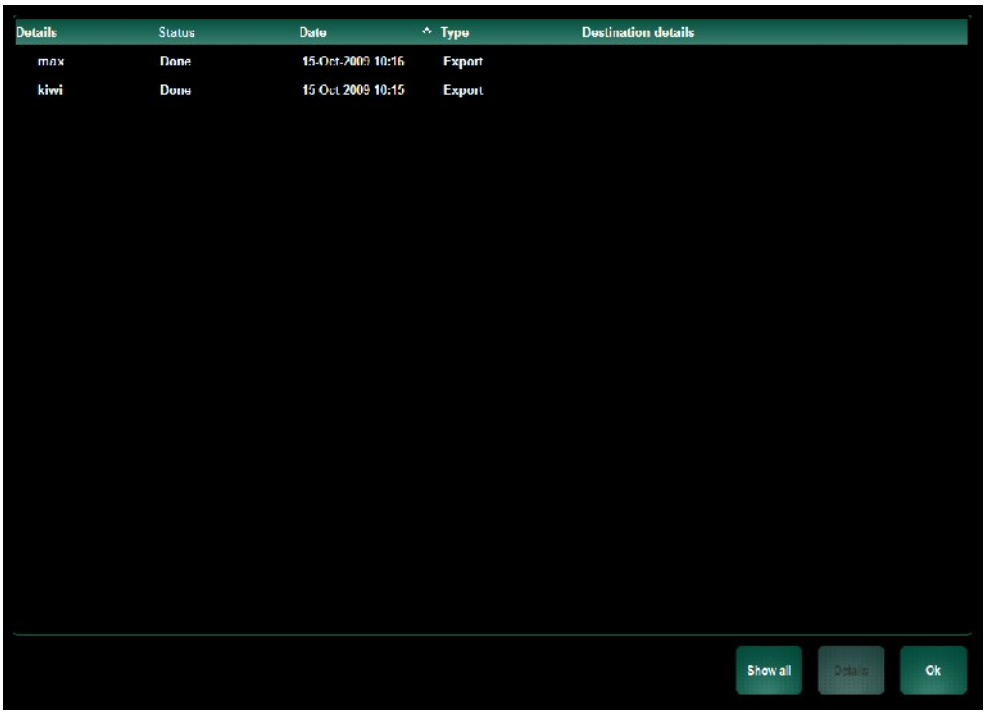
## Burner

*Burner icon*

Pressing the burner icon displays the following menu:


### Operations

This option displays the operations status. The dialogue window displays the list of exams (in the Details column), the operation status (if completed, underway or failed), the date and time of the operation and the type of operation (DICOM or Export). This window can be displayed by pressing the **OPERATIONS** key, the following will be visible:




*Burner icon*

When one or more operations have been unsuccessful, the icon is marked with an exclamation mark. The dialogue window shows which operations have failed.

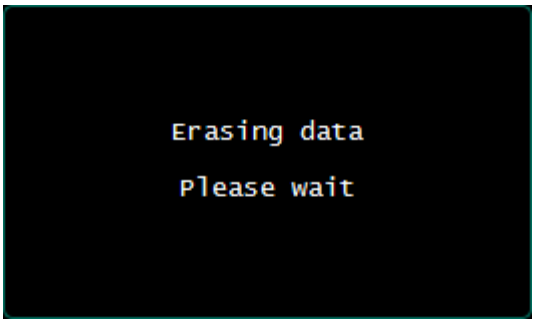
**Note**

Whenever there is a failed operation status, the **DETAIL** key will be activated. This function provides more information according to the type of failure.

### Erase Device

This option is used to delete data stored on rewritable CDs. Insert the CD in the burner, select **ERASE USB DEVICE** to begin the procedure. The following message appears:


Press the **YES** to continue the procedure. While erasing the files from the CD the following message will appear:




**WARNING**

**Do not switch the unit off while executing this procedure. The hard disk could be permanently damaged.**

## USB Medium

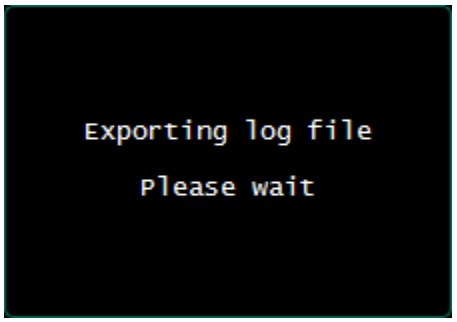
*USB medium icon*

When a USB device is connected to the system a USB icon is displayed on the top right part of the screen. Touching the icon will open the following dialog window:


**Export logfile to USB**

This option allows the user to save the logfiles onto a USB key. To save the logfiles, insert a USB key into one of the two connectors and activate the procedure.

While exporting the logfiles onto a USB key the following message will appear:

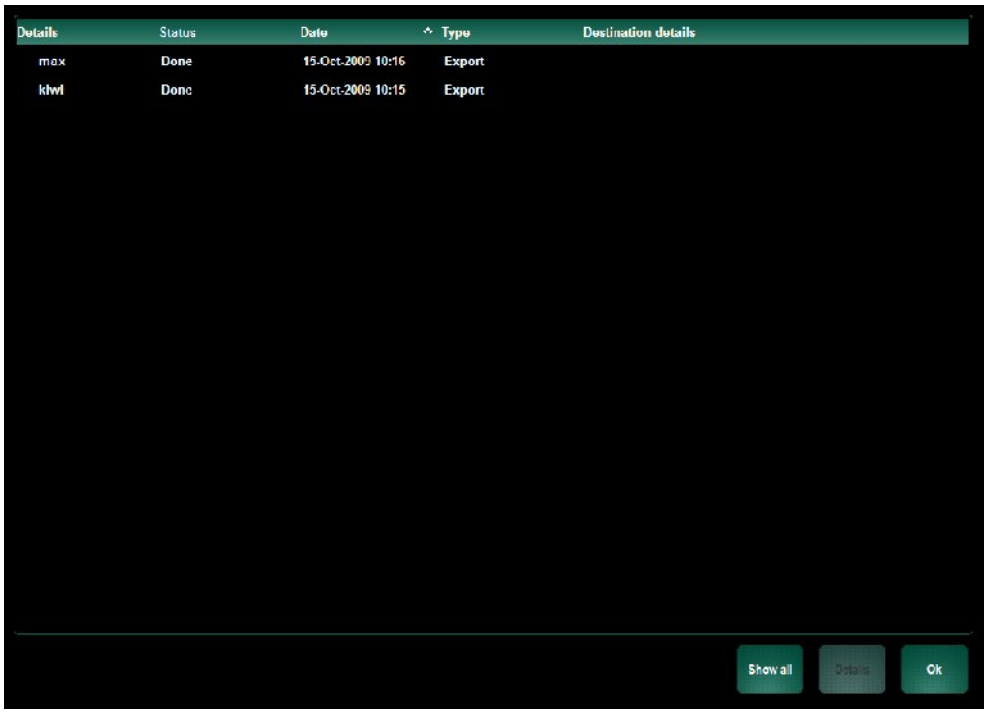



**WARNING**

**Do not switch the unit off while executing this procedure. The hard disk could be permanently damaged.**

**Operations**

This option displays the operations status. The dialogue window displays the list of exams (in the Details column), the operation status (if completed, underway or failed), the date and time of the operation and the type of operation (DICOM or Export). This window can be displayed by pressing the **OPERATIONS** key, the following will be visible:



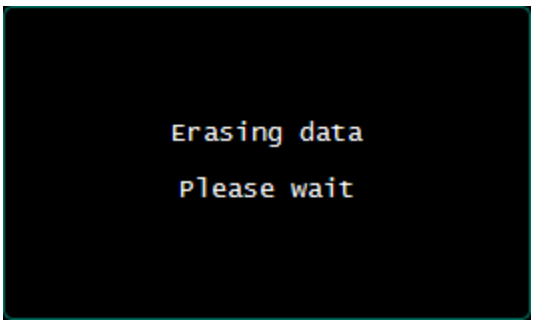

**Note**

Whenever there is a failed operation status, the **DETAIL** key will be activated. This function provides more information according to the type of failure.

### Erase USB Device

This option is used to delete stored data. Insert the USB, select **ERASE USB DEVICE** to begin the procedure. The following message appears:

Press **YES** to continue the procedure. While erasing the files from the USB key the following message will appear:




**WARNING**

**Do not switch the unit off while executing this procedure. The hard disk could be permanently damaged.**

**Safely remove USB Device**

This option is used to safely remove the USB device from the system.

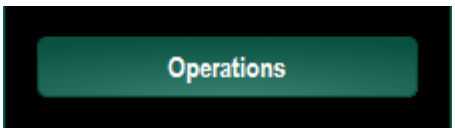
**WARNING**

**Do not unplug USB media during the system operation. Please make use of the safety removal procedure or unplug the USB device when the system is off.**

## Network

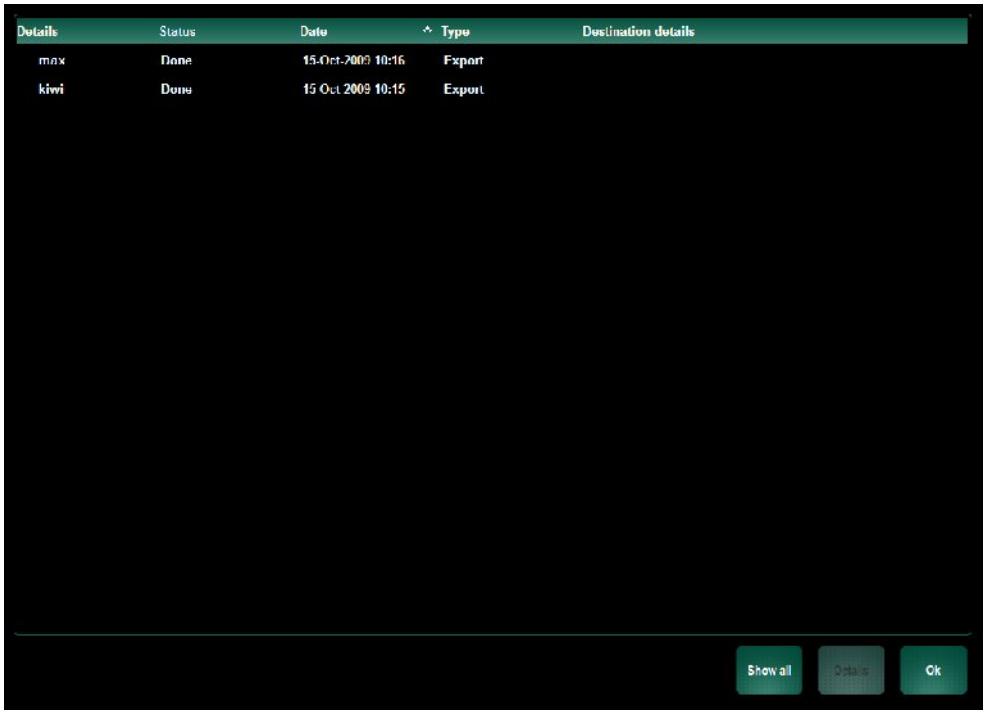
*Network Icon*

Pressing the network icon will open the following dialog window:



**Operations**

This option allows the user to select the desired network directory and to check its status, its date, the type of the network and the destination details. Pressing the **OPERATIONS** will give the following:



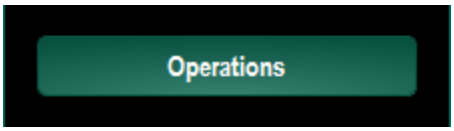

**Note**

Whenever there is a failed operation status, the **DETAIL** key will be activated. This function provides more information according to the type of failure.

## DICOM Functions

*DICOM Icon*

Pressing the DICOM icon will open the following dialog window:

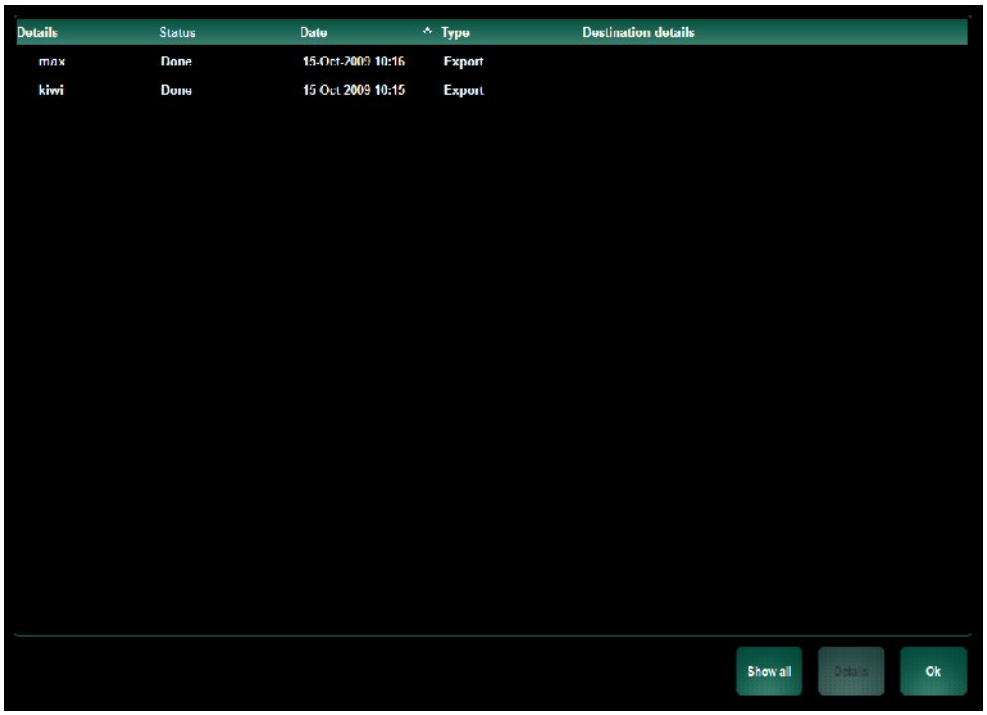


*See the "System Configuration" section for DICOM configuration*

The same instructions as those given for the network also apply to this option.

**Operations**

The option allows to check the operation status. The window displays the patients list, the operation status (completed, in progress or failed), the date and time of the operation. This window can be displayed by pressing the **OPERATIONS** key:




**Note**

Whenever there is a failed operation status, the **DETAIL** key will be activated. This function provides more information according to the type of failure.

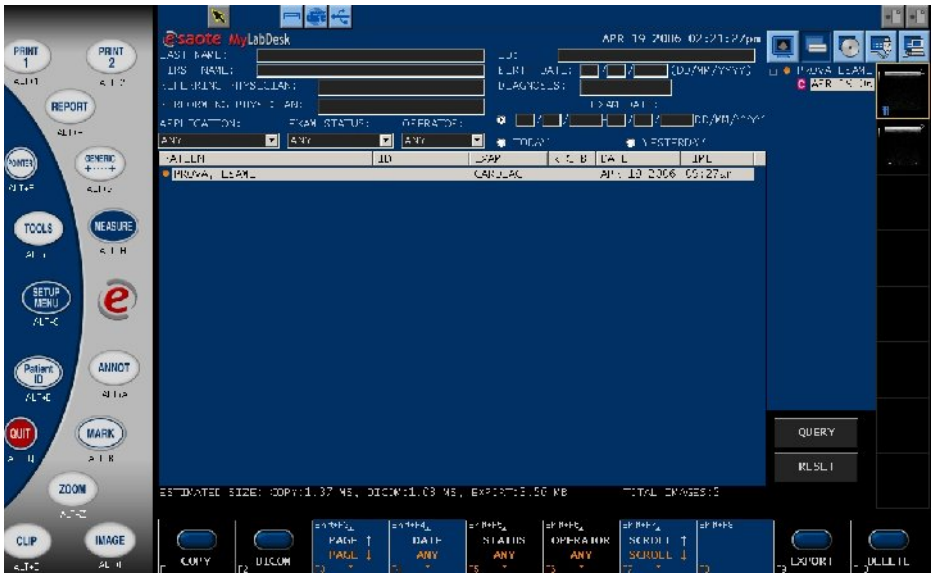
Chapter 4

# 4 - MyLabDesk

This chapter explains how to install and use the **MyLabDesk** utility.

## MyLabDesk Description

**MyLabDesk**, once installed on a PC[1], reproduces the **MyLab** working environment: its working procedures are equivalent to what is available on **MyLab**.




**MyLabDesk** offers the **MyLab** major features for exam management: exams can be archived, copied and imported in native format; patient data can be modified; measurements, annotations, body marks can be activated; images and reports can be printed and advanced tools such as Stress Echo can be activated.

> **Note**
>
> The PC mouse works as a cursor in **MyLabDesk**.

[1] Appendix A lists the PC characteristics and the available advanced calculations and tools.

# MyLabDesk Installation

**MyLabDesk** Set Up is organized in two folders: the "Archive" folder, containing copied exams, and the "MyLabDeskSetUp" folder with the installation files.

> **Note**
>
> **MyLabDesk** installation is reserved to users with an Administrator profile.

Refer to the Appendix A for the PC characteristics. Insert the medium containing the set up in the PC, select the "MyLabDeskSetUp" folder out of the File Management utility, copy the folder into a local disk and run the setup.exe file. The installation is guided by a wizard: follow the given instructions to successfully complete the installation.

> **Note**
>
> Make sure to select Vet during the installation, otherwise the archived Vet images cannot be loaded.

Once the installation is over, the desktop will include the **MyLabDesk** icon

To copy the exam archive into the PC, follow the following procedure:

- Run **MyLabDesk** by double clicking on its icon.
- Select the icon of the source medium (CD/DVD, USB, Network).

| Media Archive | USB Archive | Network Archive |
|---|---|---|
|  |  |  |

- The system lists all exams available in the medium: using the cursor select the exams to be locally imported.
- Press the **COPY** key and select "Local Archive"
- Press OK to start.

*Refer to the next paragraphs for further information.*

**Language**

**MyLabDesk** is available in the following languages: Italian, English, French, German and Spanish. The default language is English.

## How to use MyLabDesk

With the exception of the **SETUPMENU**, ∈ and **QUIT** keys, **MyLabDesk** keys work as the corresponding **MyLab** commands**:** **ANNOT** activates the annotation menu, **IMAGE** saves single frames etc.

**Short Cut Keys**

In some cases the cursor is controlled by the active function (e.g. when tracing distances, area or profiles in the measurements environment, or selecting words in the Annotations function.). In these situations the short cut keys can be used to activate software and control panel keys.

Below each control panel key there's the indication of the correspondent short cut (ALT + *l*). Each software key has two short cuts (Fn and SHIFT + Fn) while each software button has only one (Fn).

Right click to interrupt the active operation and free the cursor.

## Complex Measurements

Some measurements of the cardiac calculations package require the selection of a different view or a different modality. Before starting complex measurements, make sure that the available images allow the user to complete them.

Measurements are system guided: operating instructions are given on the lower part of the screen.

**Procedure**

- Select the desired image.
- Press the **MEASURE** key and select the group.
- Follow the instructions to perform the first set of measurements.
- When requested, select the next image.
- Press **MEASURE** again to proceed with measurements.
- Repeat the procedure to complete measurements.

## Setup Menu Key


This key displays the **MyLabDesk** configuration menu. The menu allows the user to configure:

- Reports
- Application Measurements

- Generic Measurements
- Glossary
- Peripherals
- Network Directory
- DICOM Configuration
- Export Settings
- Tools Preset
- General Configuration
- Image Review Configuration

**DICOM Configuration**
The menu includes three folders: General, Quality and Report. The first folder allows the user to assign the AE Title and set the forwarding modalities of stress echo views. Images characteristics and report forwarding modalities are defined in the other two folders.

**General Configuration**
The menu allows the user to set language, date and time format, height and weight format and center ID. The same menu allows the user to select the environment, human or vet.

**Image Review Configuration**
Brightness and contrast of the images displayed on screen can be adjusted through this option.

Refer to the "System Configuration" section for further details on the single options.

## QUIT and e Keys

e displays the **MyLabDesk** version and **QUIT** closes the program.

## Navigation

All **MylabDesk** features are available both on local exams and on the ones archived on external media. Select the pertaining icon to access the remote archives.

The **COPY** key copies into a local folder exams archived in native format on external media.

Appendix A

# Appendix A - PC Requirements

## PC Requirements

The suggested PC configuration includes the following requirements:

- Windows® XP (Home or Professional), Windows Vista™ Windows® 7 or Windows® 8
- CPU Pentium IV 1.5 GHz MHz or higher
- HD: at least 2 GB of free space
- RAM: minimum 512 MB, suggested 2 GB
- Video board minimum 128 MB supporting 32 bit true color
- Video resolution: minimum 1024 x 768 (128MB video board suggested), suggested 1280 x 1024 (512MB video board suggested)

*Control Panel Icon*

With a 1280 x 768 video resolution, the control panel is minimized. To maximize it and be able to access its commands, place the cursor on the icon and press **ENTER**.

*Minimizing icon*

The minimizing icon reduces **MyLabDesk** to icon

> **Note**
>
> **MyLabDesk** installation can only be performed by users with an Administrator profile.

To check the active user profile, access the "User Account" utility in the PC Control Panel.

# SYSTEM CONFIGURATION SECTION

This section explains the options available in the System Configuration menu. The section is organized as follows:

- Chapter 1: System Menu

  This chapter describes the setup menu of the **MyLab** and the configuration options available in the system.

- Chapter 2: System Setup

  The chapter includes display options for the user interface and the calibration of the touch screen. Modifications can be made regarding the measurement units and the generic aspects, as well as the archive and export services.

- Chapter 3: Peripherals

  This chapter explains how to set the peripheral units.

- Chapter 4: Measurement & Analysis

  This chapter explains how to customize the calculation packages of each application.

- Chapter 5: Network Configuration

  This page encloses settings for system configuration in the network and configuration of network directory and wireless.

- Chapter 6: Tools

  This option allows modifying and saving both the gray map selected in the active application and the settings of the Protocol Editor.

- Chapter 7: Security

  This chapter explains how to set the list of users allowed to access the system.

- Chapter 8: Miscellaneous

This chapter encloses information about the system configuration. Setup of the body marks and annotations is also available in this setup environment.

- Chapter 9: Export Settings

  This chapter explains which formats can be set to export the exams.

- Chapter 10: Peripherals Controls

This chapter explains the controls on the exterior of the **MyLab**. It also takes into account the buttons of peripheral devices.

# Table of Contents

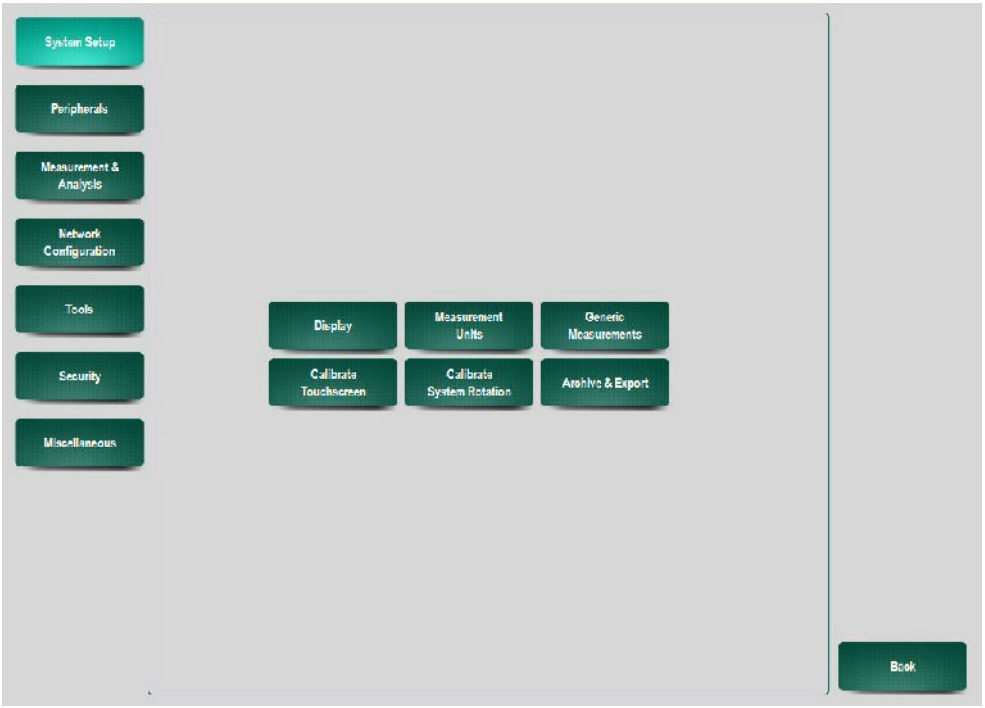
Chapter 1

# 1 - System Menu

This chapter describes the setup menu of the **MyLab** and the configuration options available in the system.

## System Menu


Under the **SETTINGS** tab the **MENU** key is available and it gives access to the system menu.




The setup menu is organized by a tree structure composed of main options roots listed on the left of the screen; selecting a root shows the sub-menu pages enclosed and available.

Selecting one of the options opens a configuration page enclosing all the settings for customization.

The new parameters will be operative immediately.

**Setting Parameters**

- Choose the parameters to be set.
- Select an option from the window menu and press **OK** to confirm.
- If input is needed on a field, press on the field and use the alphanumeric keyboard that appears.
- Pressing the **CANCEL** key closes the setup window (without confirming) and goes back to the main configuration page.

**Note**

After changing one of the settings, wait 5 seconds before switching the system off in order for the new parameters to take effect.

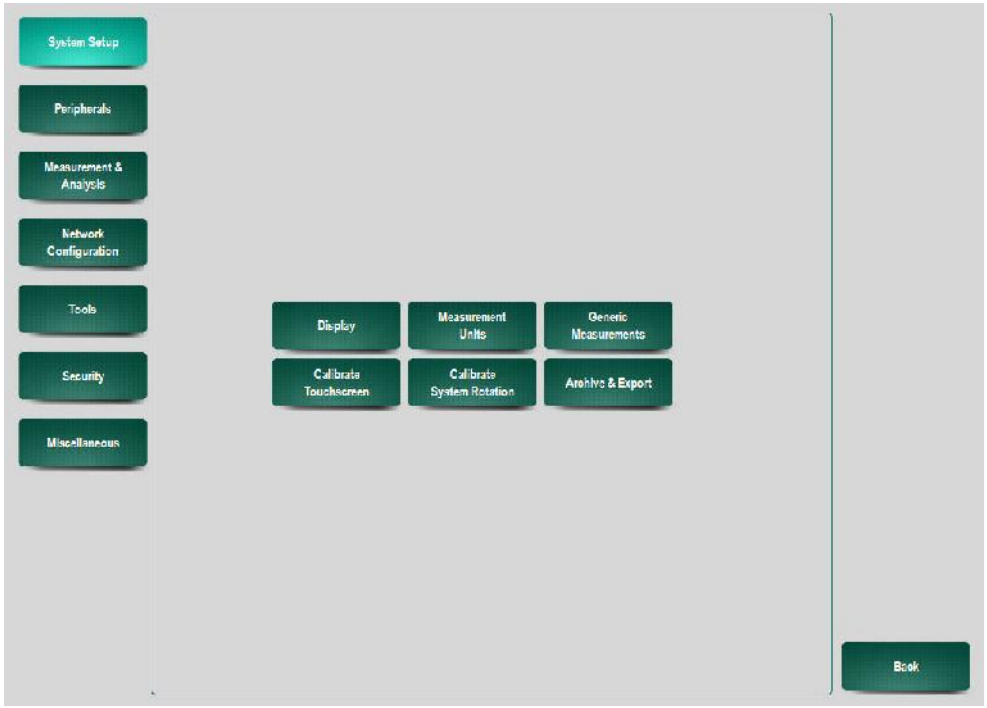
Chapter 2

# 2 - System Setup

This chapter lists the options that are available in **SYSTEM SETUP** and explains how to configure the parameters.

## System Setup Menu


When pressing the **SYSTEM SETUP** key the following screen is visible:




The options available under System Setup are:

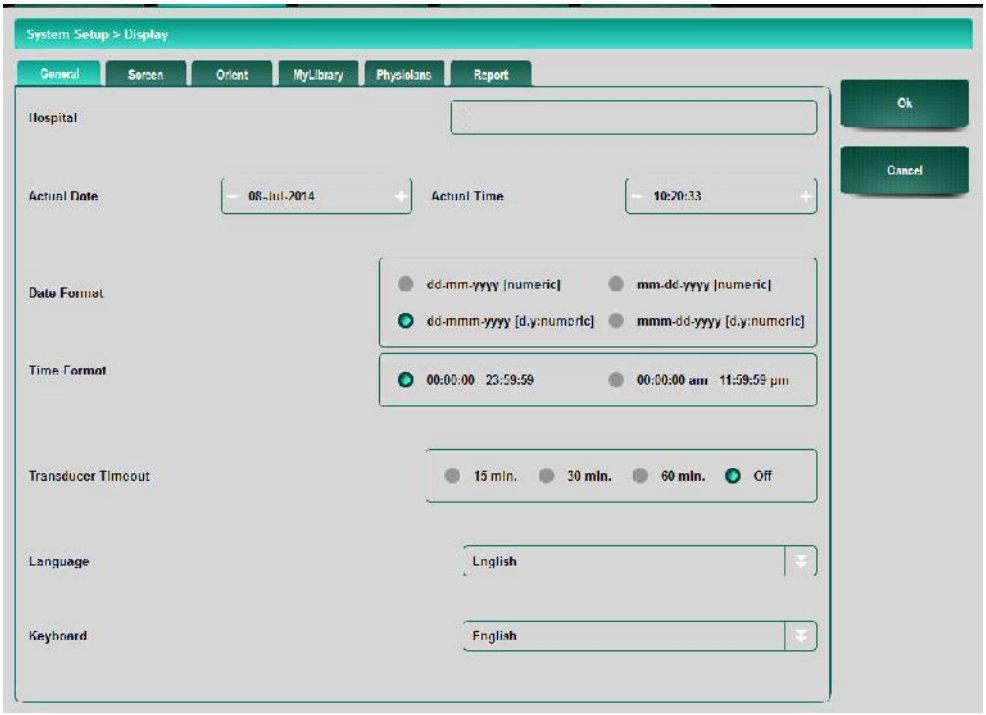
- Display
- Measurements Units
- Generic Measurements
- Calibrate Touchscreen

- Calibrate System Rotation
- Archive & Export

### Display

The display environment is organized with four tabs: **GENERAL**, **SCREEN, ORIENT** and **MYLIBRARY**, **PHYSICIANS** and **REPORT**.

### General

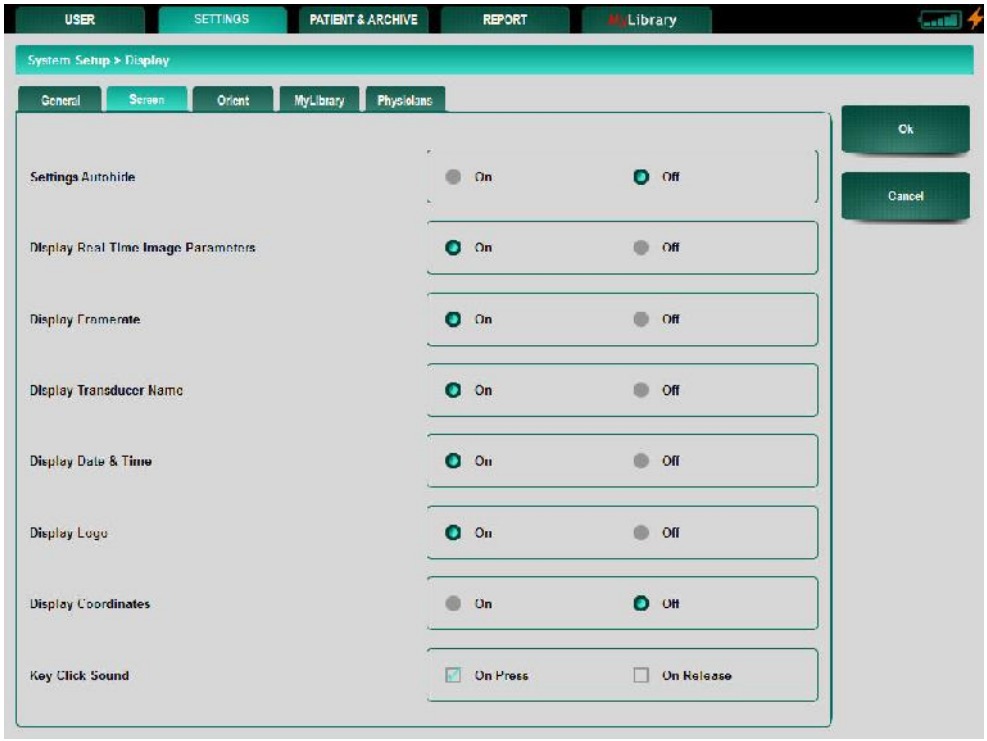



### General

| Parameter | Description |
|---|---|
| **Hospital** | Editable field for the hospital name. |
| **Actual date** | This field sets the date. |
| **Actual Time** | This field sets the time. |
| **Date Format** | This setting allows the user to define the format of the date as it is displayed on the screen. |
| **Time Format** | This setting allows the user to define the format of the time as it is displayed on the screen. |
| **Transducer Timeout** | This setting allows the user to define the time for the screensaver to be activated. |
| **Language** | This setting allows the user to define the language of the user interface. |
| **Keyboard** | This setting allows the user to define the layout of keyboard. |

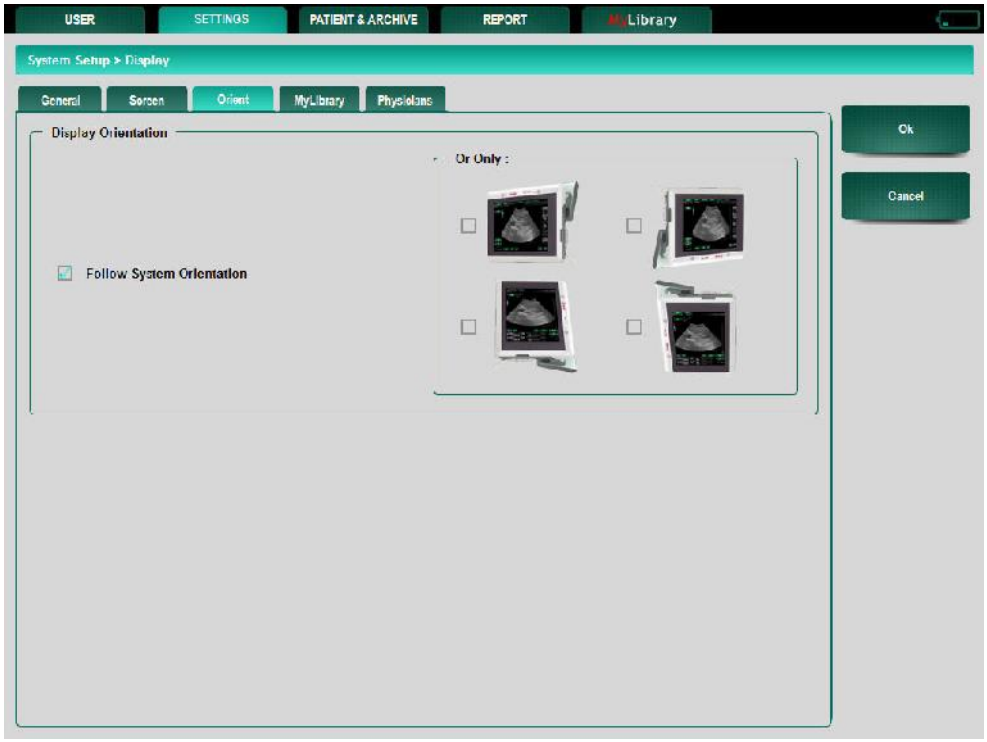
### Screen

Within this menu the appearance of information on the screen can be customized.




| Parameter | Description |
|---|---|
| **Settings Autohide** | The Settings controls can be set to autohide or be always visible on the screen. |
| **Display Real Time Image Parameters** | Enables display of image parameters on the screen. |
| **Display Framerate** | Enables display of framerate on the screen. |
| **Display Transducer Name** | Enables display of transducer name on the screen. |
| **Display Date & Time** | Enables display of date and time on the screen. |
| **Display Logo** | Enables display of Esaote logo on the screen. |
| **Display Coordinates** | Enables display of x and y coordinates. |
| **Key Click Sound** | Allows the user to define the sound when touching the controls on the screen. |

### Orient



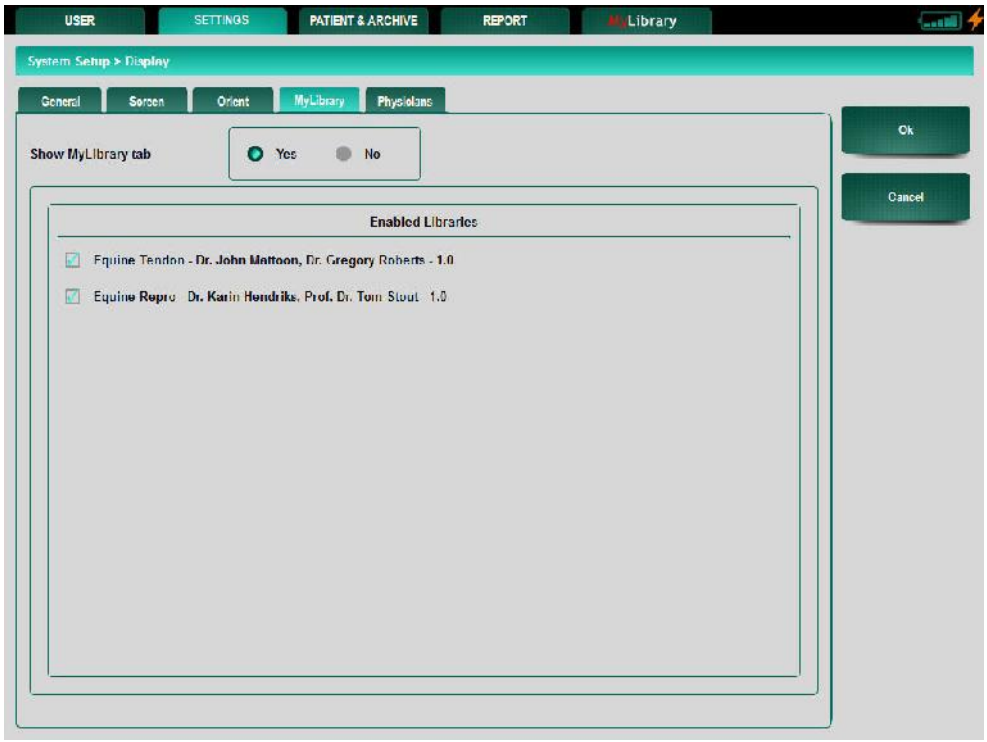

The display orientation can be adjusted according to the user's wishes. An activated 'follow system orientation' box will make sure when turning the system, the screen will turn accordingly. Orientations whose checkboxes are disabled will not be available on the screen when turning the system.

### MyLibrary

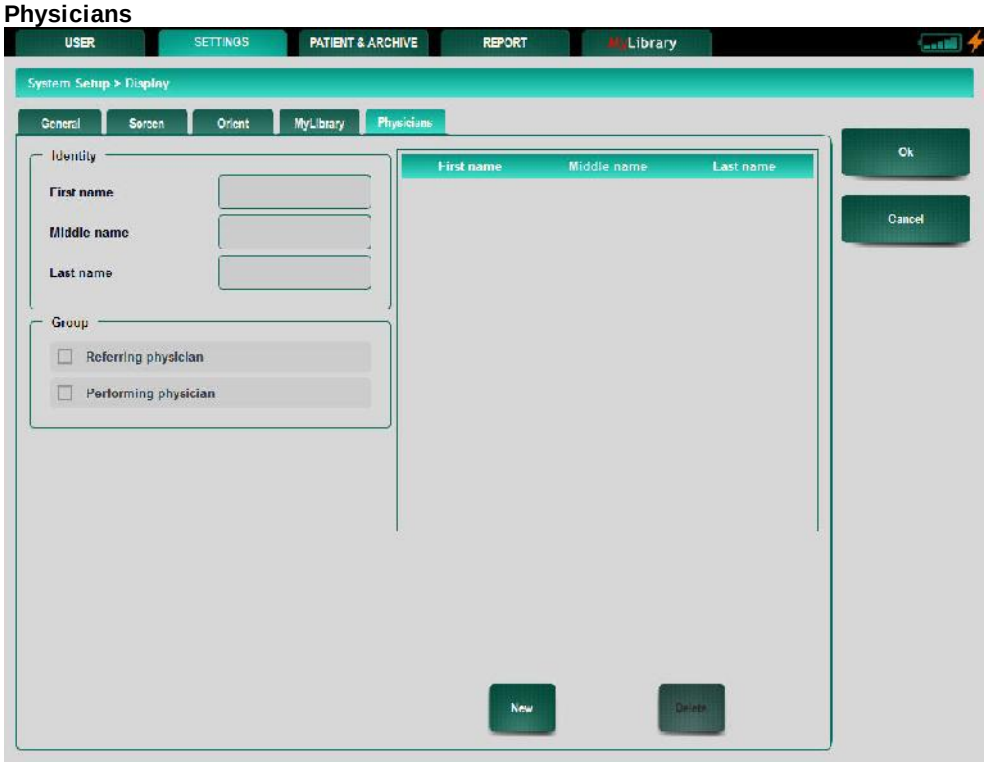
MyLibrary can be enabled by clicking the box 'Yes' showing the MyLibrary tab in the control tabs on top of the screen.

**Note**

The Library is only available when the corresponding license is activated.

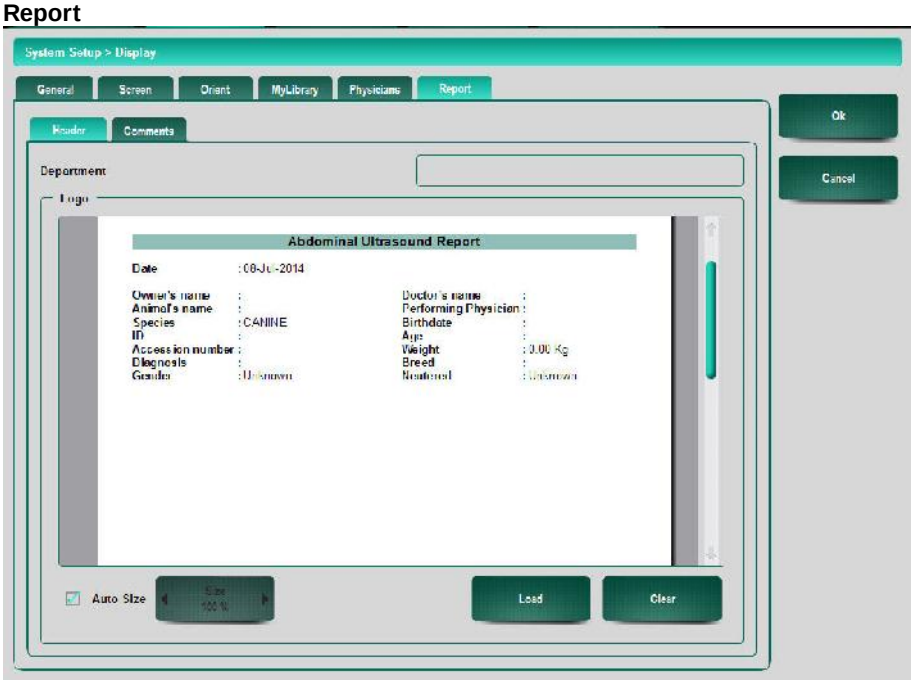



**Physicians**




With this menu users have the possibility to add names of physicians that can be recalled by pull-down menu in the **PATIENT & ARCHIVE** menu.

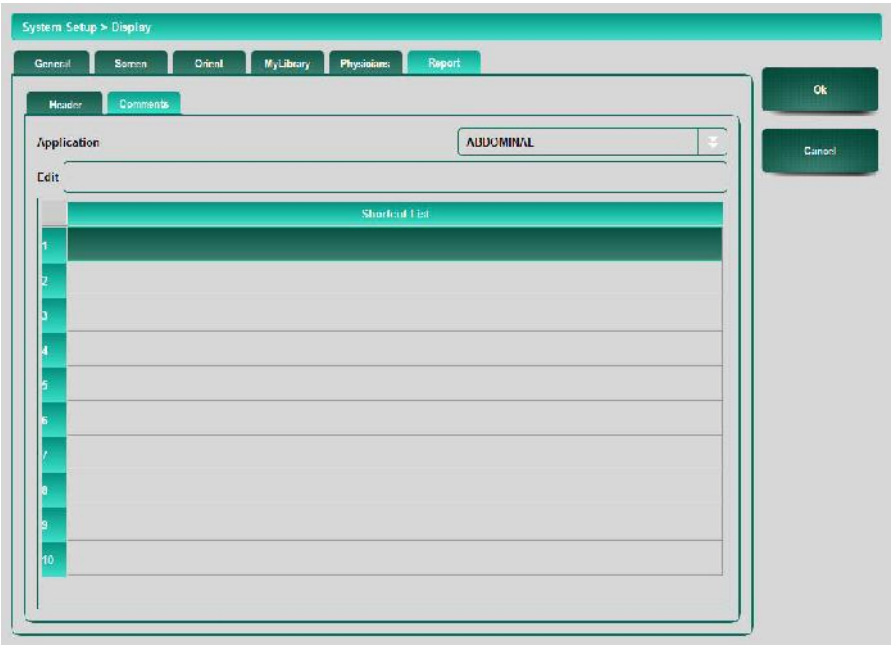
**Report**




In the **REPORT** menu several properties of the report can be personalized.

The first menu is the **HEADER** menu. On this screen the user can modify the name of the Department executing the examination. Another option on this screen is to add a logo to the report. The **LOAD** button opens a screen were the user can select a logo image file, for instance from an USB memory stick. The **CLEAR** button removes the added logo file. The size of the logo can be adjusted with the **SIZE** button or it can be set to auto size.

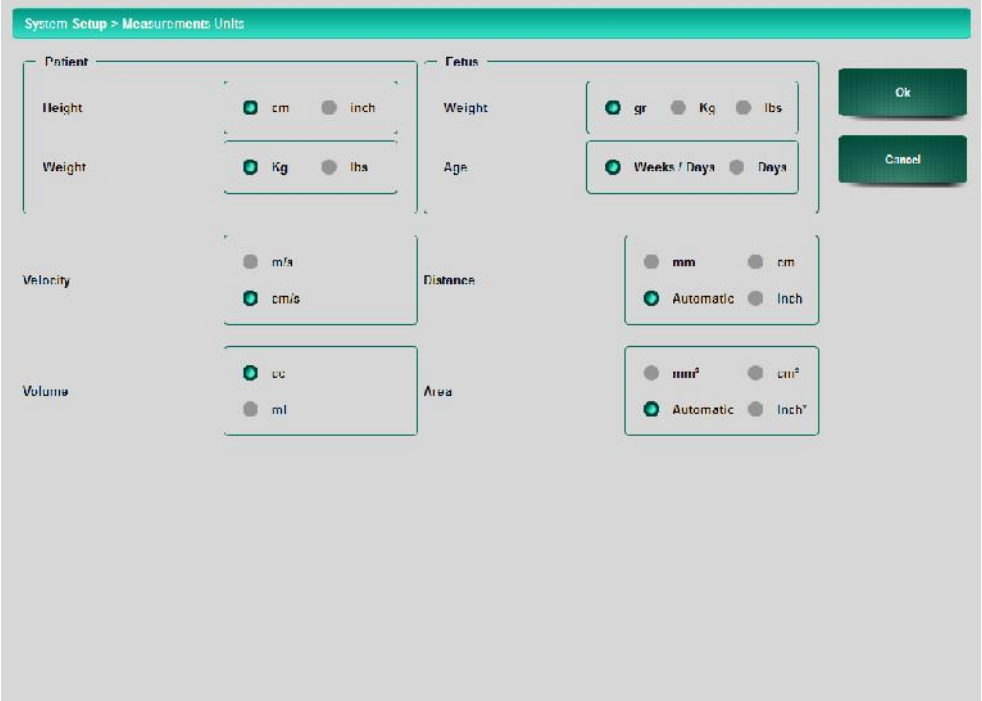
The second menu is the **COMMENTS** menu.



On this screen the user can define comments which will be available as a checkbox in the **COMMENTS** field of the report.
The user can select the application, select a comment number and edit the text.

### Measurements Units

This option allows the user to set the preferred measurement units.




| Parameter | Description |
|---|---|
| **Patient Height/Weight** | Defines the units of height and weight of the patient. |
| **Velocity** | Sets the unit for velocity measurements. |
| **Distance** | Sets the unit for distance measurements. |
| **Volume** | Sets the unit for volume measurements. |
| **Area** | Sets the unit for area measurements. |

Distance and Area have available an Automatic option. This option sets the unit automatically to mm and cm or mm2 and cm2 according to the following criteria:

- If the distance is less than 1 cm, then mm is adopted as unit; otherwise cm is used.

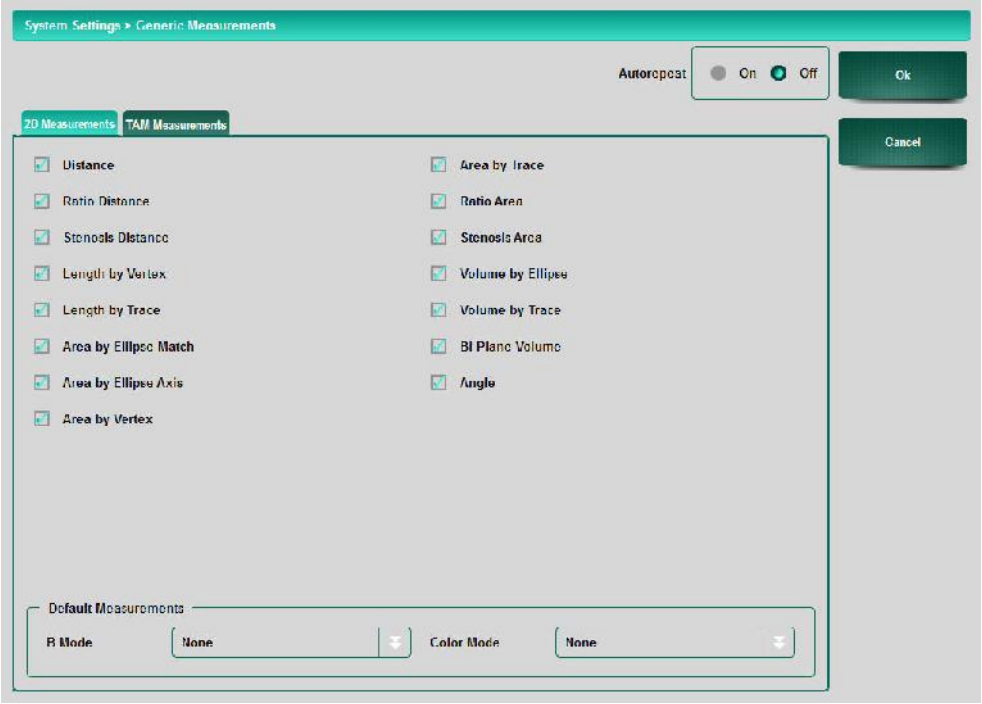
The area unit is set to the same unit as used for the distance.

### Generic Measurements

This option allows the user to program the generic measurements available for each application. The menu is organized in two tabs: **2D MEASUREMENTS** (listing generic measurements available in 2D mode), **TAM MEASUREMENTS** (for M-Mode and Doppler).

### 2D Measurements

Under the **2D MEASUREMENTS** tab the following view is shown:




The 2D Measurements configuration page allows measurements to be included or excluded from this list in 2D mode.

The Autorepeat option enables the auto-repeat function for the generic measurements. This means that, when a measurement is completed, the same type of measurement is automatically enabled to be performed again.

The Default Measurements area allows to set the starting measurement if the **CALIPER** key is pressed in B-mode and Color Mode.

> **Note**
>
> The Default Measurements list includes also the option 'None'. When 'None' is selected, pressing the **CALIPER** key displays the list of measurements without enabling any measurement automatically.

### TAM Measurements

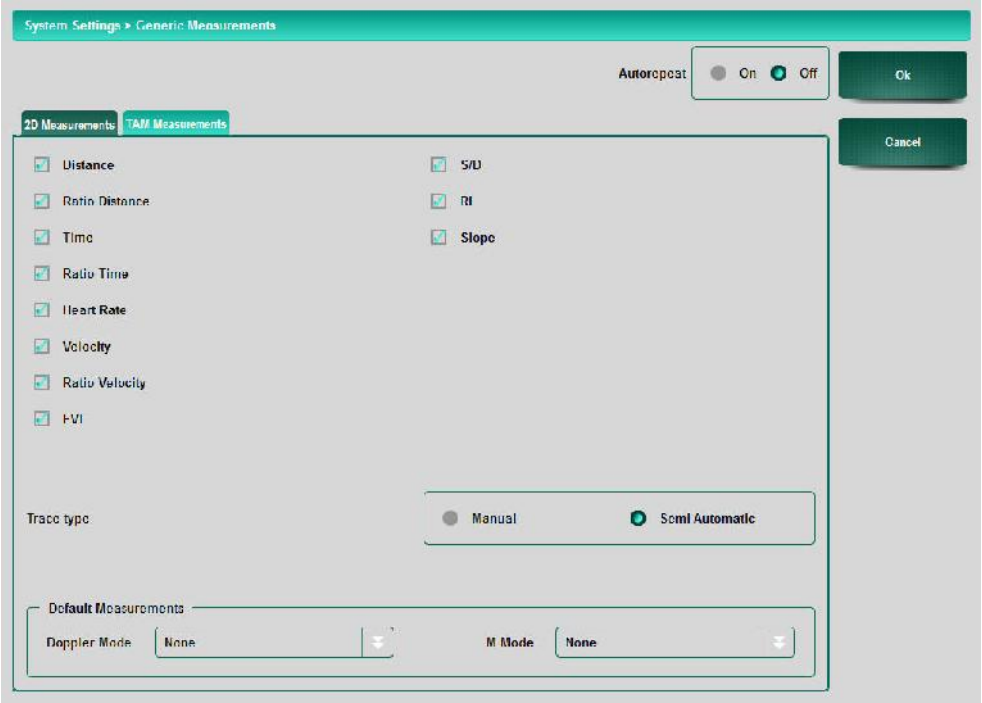
The TAM Measurements configuration page selects measurements to be included or excluded in M-Mode and Doppler-mode.

**Configuration procedure**

- Enables or disables measurements from the measurement list in TAM modes.
- Set the default measure. This measure will be active as soon as the **CALIPER** key is pressed. When choosing the "none" option, no

measure will be automatically enabled when the **CALIPER** key is pressed.

The Autorepeat option enables the auto-repeat function. This means that, when a measurement is completed, the same type of measurement is automatically enabled to be performed again.




The Trace Type area configures whether the Doppler spectrum has to be traced manually (following the spectrum profile on one cardiac cycle) or automatically (by setting the beginning and the end on the spectrum and let the system trace the profile).

### Touchscreen Calibration

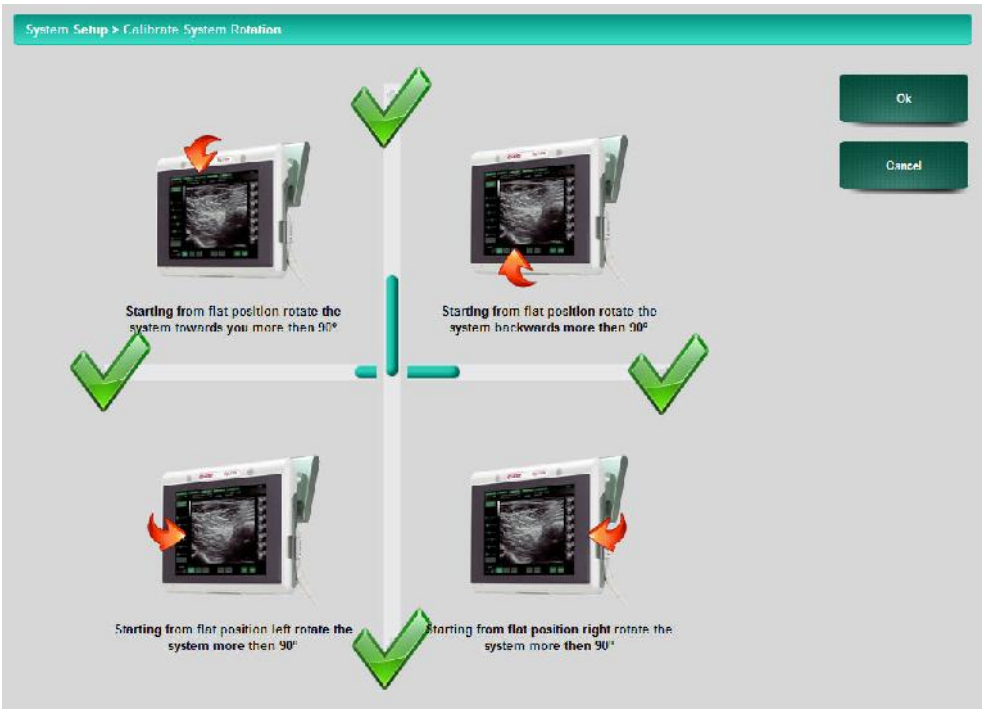
This feature allows the user to re-calibrate the touchscreen.


This operation is very important and delicate. Please perform the operation with the touch screen stylus and follow the instructions as given on the screen by the system.

**Calibrate system rotation**

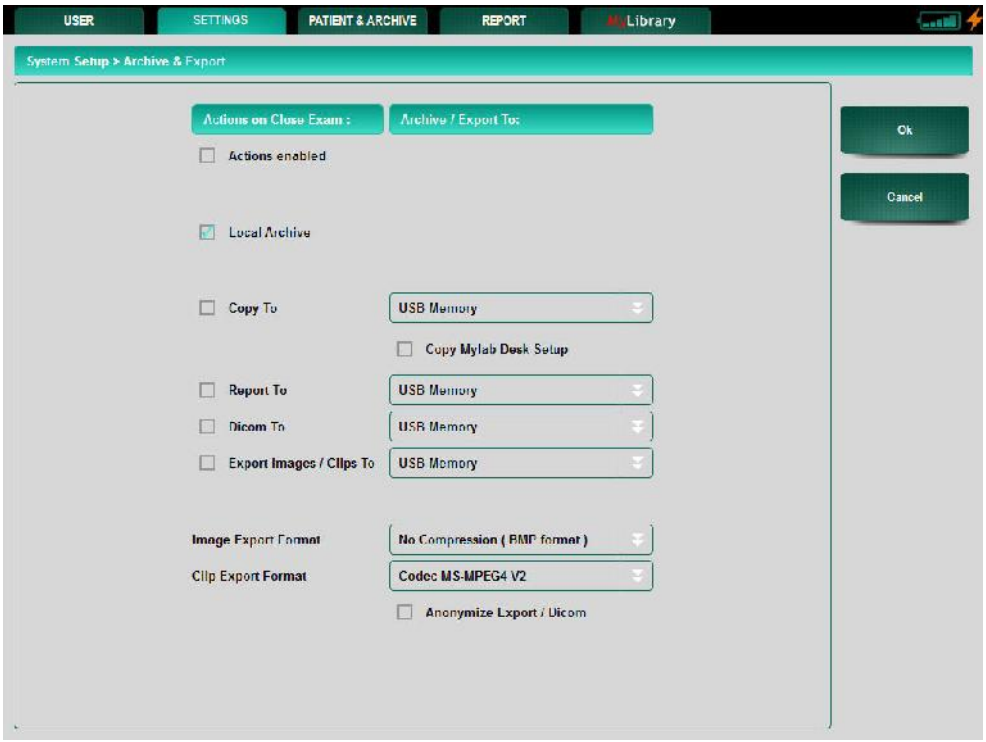
In this menu the tilting sensor can be calibrated. Follow the instructions as displayed on the screen.

When the tasks on the screen are correctly executed, green signs will appear as shown in the picture below:




### Archive & Export

This option allows the user to enable or disable export and archiving features in the system.



- 'Actions enabled' allows to automatically execute archive actions as specified in the Archive & Export menu of the System Setup. When enabled the warning "Exam not Closed" page will not appear when pressing the **CLOSE EXAM** button and the specified archive actions will be executed.

- Local Archive activates the capability to archive exams in the local database of the system.

- Copy To enables the system to copy the exam in proprietary format into an external memory medium.
  The option Copy MyLab Desk Setup, when enabled, copies the executable file into the same memory medium for the installation of MyLab Desk on an external PC.

- Report To activates the capability to export the report into an external memory medium.

- Dicom To enables the export in DICOM format of the exam.

- Export Images/ Clips To activates the capability to export images and clips into a memory medium in commercial formats (BMP, AVI, etc).

- Image Export Format allows to choose the image format (BMP, PNG or JPEG).

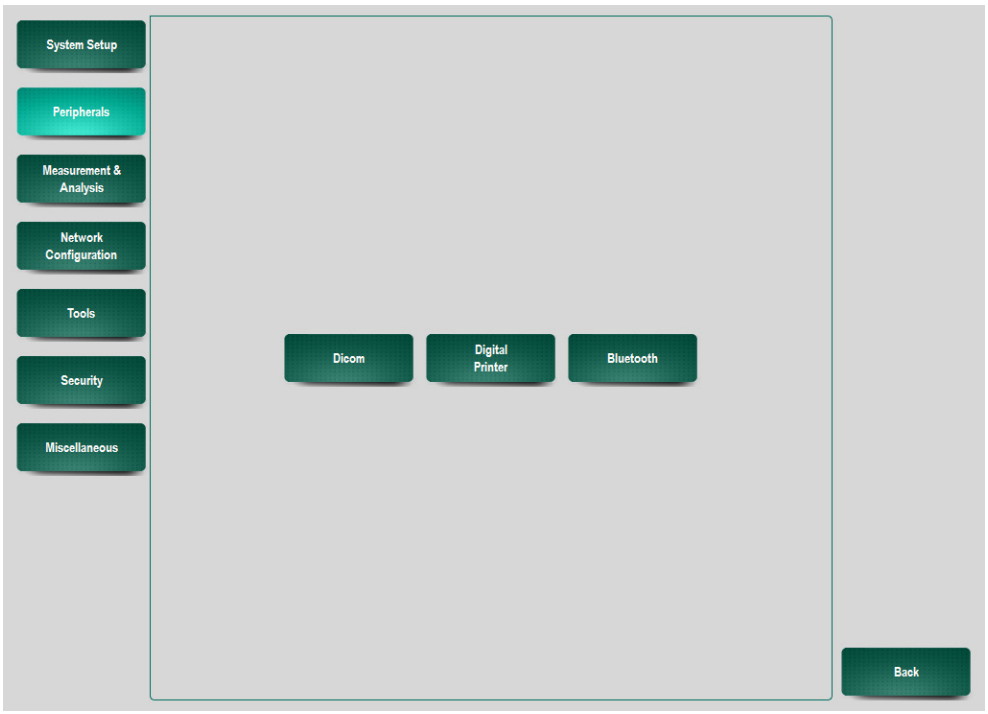
- Clips Export Format allows to choose the clip format (Codec MS-PEG4 V2, Codec MS-VIDEO1).

- Anonymize Export/Dicom allows to remove the patient data from the images and clips that are exported.

Chapter 3

# 3 - Peripherals

Peripherals of **MyLab** can be configured accessing the Peripherals setup environment. When pressing the **PERIPHERALS** key the following screen is visible:

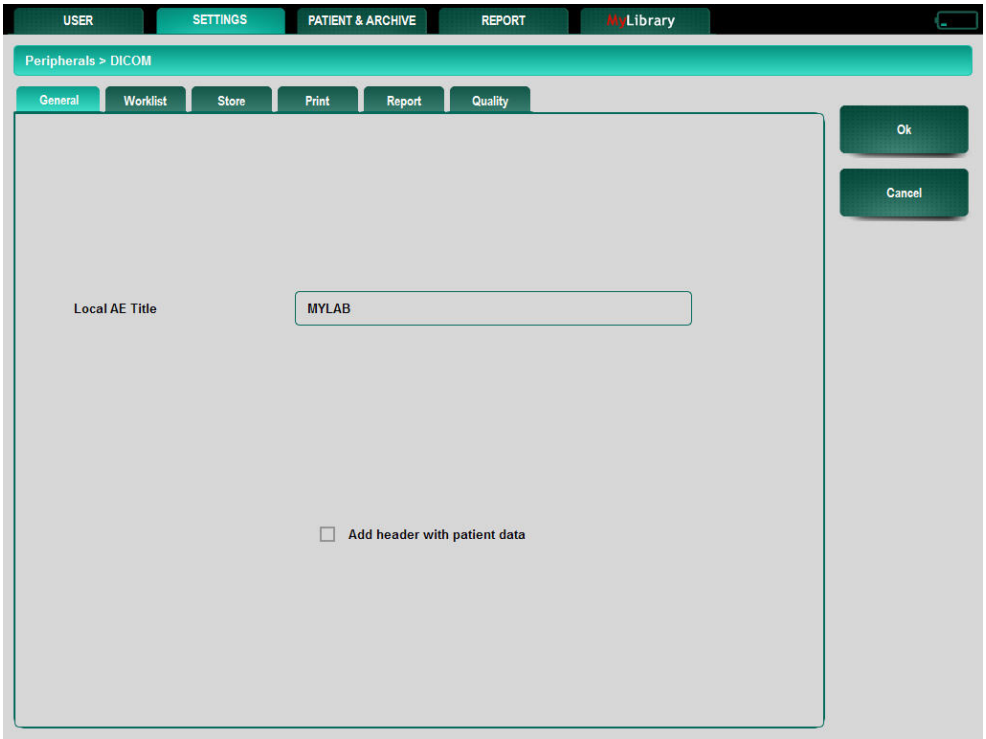

## DICOM

Selecting this option allows the configuration of **MyLab** in DICOM networks and DICOM functions. DICOM option is available if the DICOM license is enabled.

The configuration menu is organized in six tabs: **GENERAL**, **WORKLIST**, **STORE**, **PRINT**, **REPORT** and **QUALITY**. Pressing on the tabs will access the sub-menu.

### General

The option sets the **MyLab** AE Title. This field encloses the Application Entity Title of the scanner. The factory setting is "MYLAB". Also the user has the option to add a header with patient data to DICOM exports.

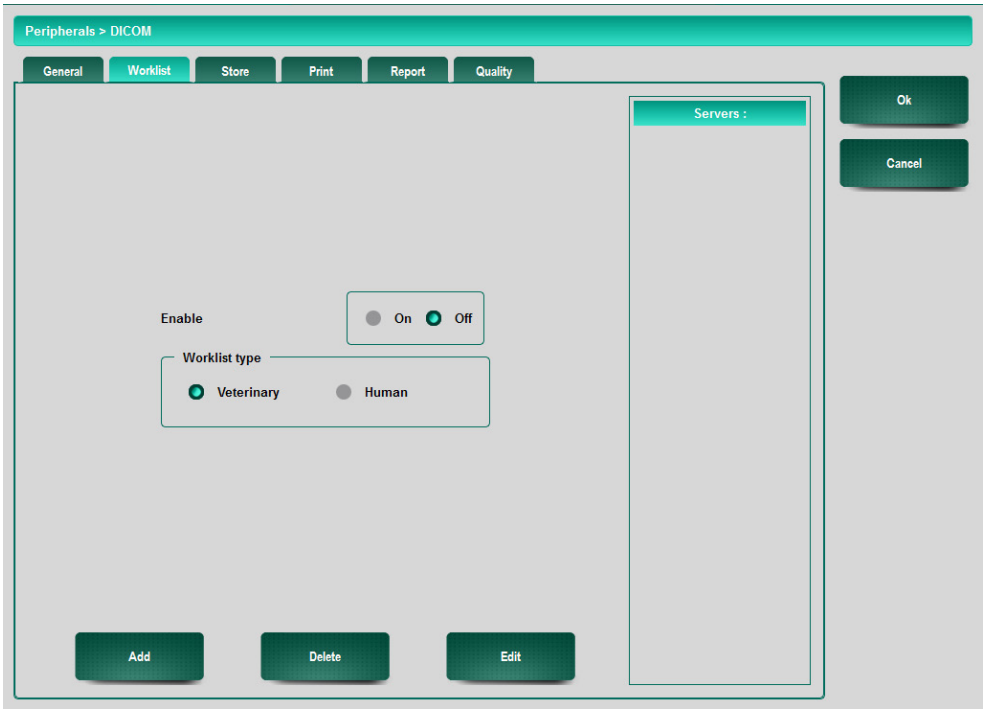



*OK and CANCEL keys*

In the sub-menu, the **OK** key exits from the menu saving the settings while the **CANCEL** key without saving.

### Worklist

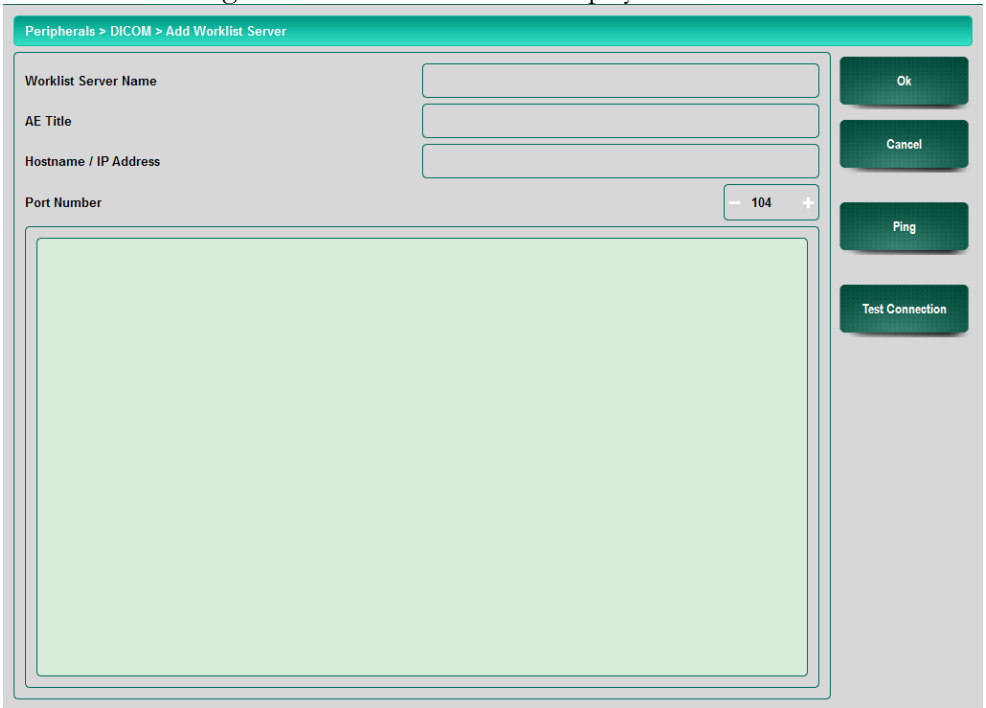
The DICOM **WORKLIST** functions as an exchange server for patient data. To retrieve this data, activate the worklist by clicking the ON button.



**Procedure**

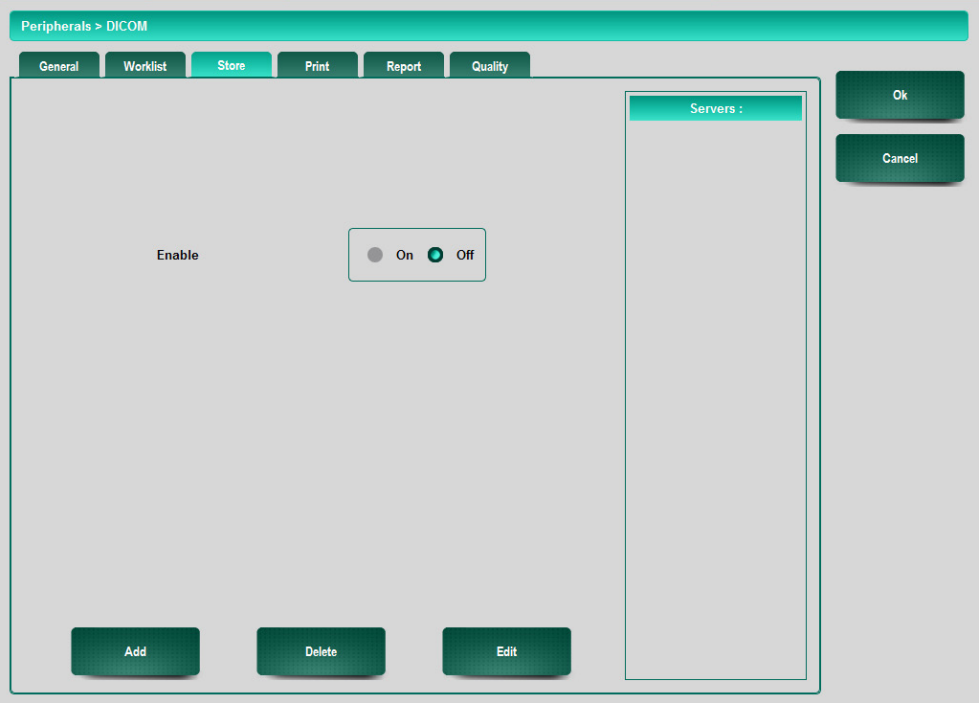
Add the DICOM server of the facility or edit servers that are already in the list. By pressing the button **ADD** and completing the form below.

The form of adding the WORKLIST server is displayed below.




**Store**

This function enables or disables the possibility to export images to DICOM servers via network. The DICOM class is used only when the Enable option is 'On'.



The DICOM class is active only when the Enable option is 'On'.

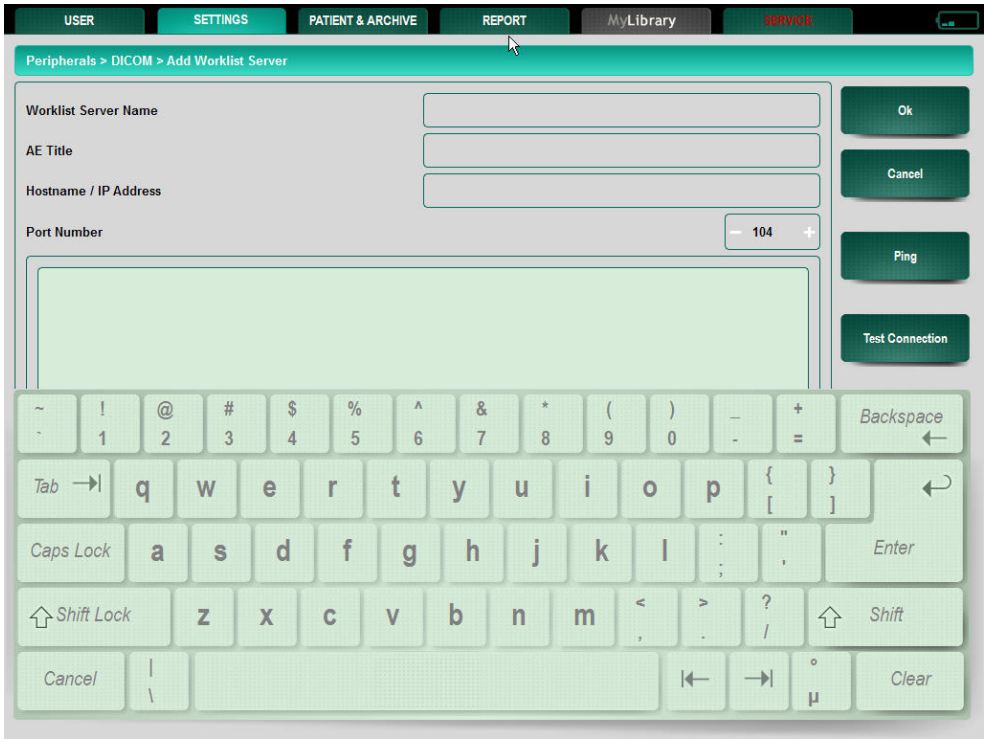
The configuration menu of these DICOM classes allows the user to add (ADD option), delete (DELETE option) one Storage server, or to modify (EDIT option) its parameters.

To add a new Storage server press **ADD** button and compile the following form.

**Procedure**

- Press the **ADD** button.

The Storage server configuration window is displayed:




| Parameter | Description |
|---|---|
| **Store Server Name** | Sets the name of the Storage server. |
| **AE Title** | Sets the Application Entity Title of the scanner. |
| **Hostname / IP Address** | Network Path or IP address of the shared folder. |
| **Port Number** | Sets the port number of the Storage server. |
| **PING** | This key is used to check whether a particular DICOM server is reachable across the IP network. |
| **Test Connection** | This key is used to check the network connection to the store server. |

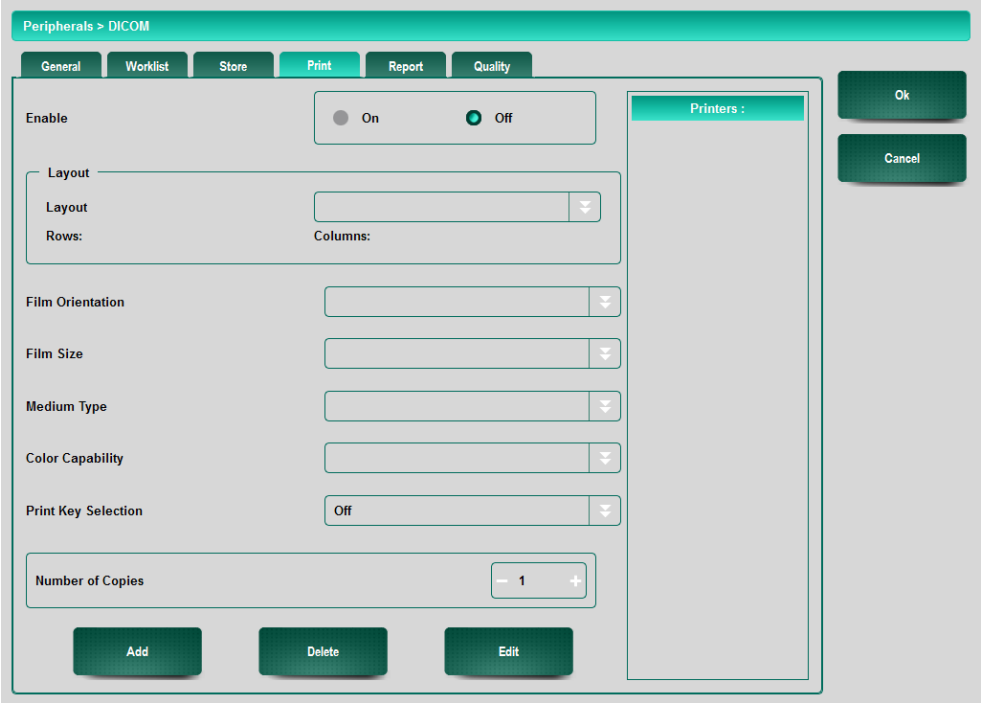
**Note**

To use DICOM functions, a static IP address is recommended.

Please refer to the local network administrator for network data of the DICOM modalities and of **MyLab**.

### DICOM Printer Configuration

The option allows the user to set the DICOM printer model and its printing configuration.




| Preset | Action |
|---|---|
| **Printers** | This field lists all the printers configured in the system. |
| **Enable** | Enables or disables the possibility to print images by DICOM printers via network. |
| **Layout** | Selects the layout of the printout. |
| **Film Orientation** | Sets whether printing in portrait mode or landscape mode. |
| **Film Size** | Selects the film to print (if more than one is available for the selected printer). |
| **Medium Type** | Selects the type of medium to print on (clear film, blue film, paper). |
| **Color Capability** | Sets whether printing in color mode or grayscale mode. |
| **Print Key selection** | Sets the button on the keyboard to use for printing. |
| **Number of copies** | Sets the number of copies to be made. |

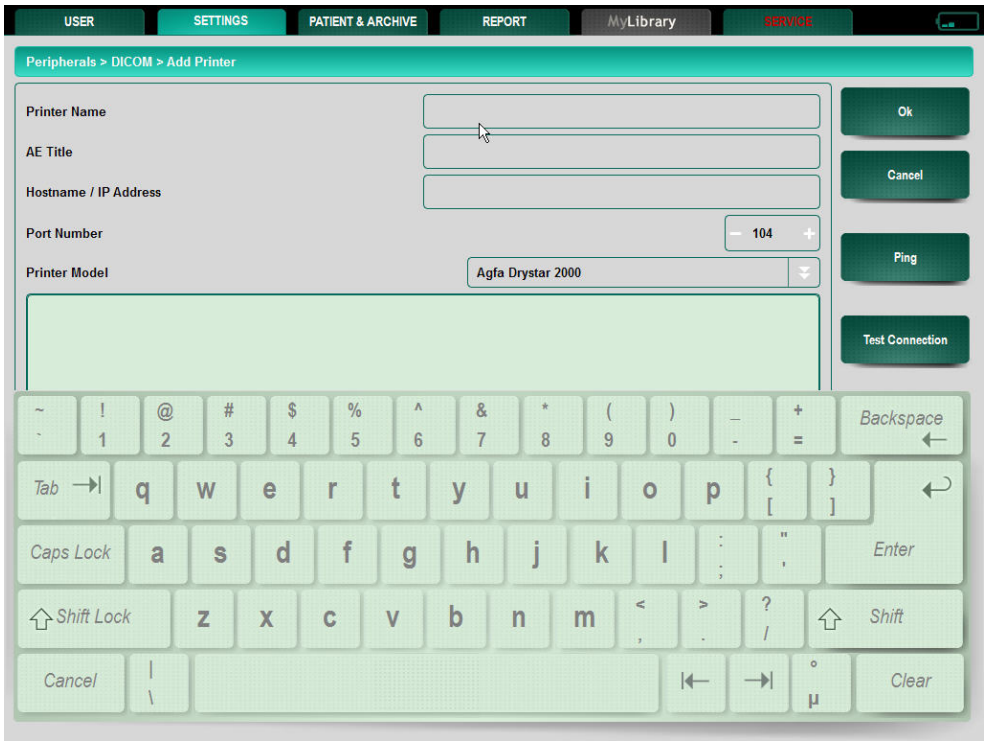
The configuration menu of the DICOM printer allows the user to add (**ADD** key), delete (**DELETE** key) one DICOM printer, or to modify (**EDIT** key) its parameters.

To add a new Printer server press **ADD** button and compile the following form.

**Procedure**

- Press the **ADD** button.

The Printer server configuration window is displayed:




| Parameter | Description |
|---|---|
| **Printer Name** | Name of the Printer server. |
| **AE Title** | Sets the Application Entity Title of the scanner. |
| **Hostname / IP Address** | Network Path or IP address of the shared folder. |
| **Port Number** | Sets the port number of the Printer server. |
| **Printer Model** | This pull-down menu lists the printer models that can be connected to DICOM. |
| **PING** | This key is used to check whether a particular DICOM server is reachable across the IP network. |
| **Test Connection** | This key is used to check the network connection to the dicom printer. |

### DICOM Printers

Refer to the site www.esaote.com for the detailed list of the compatible DICOM printers.

**Print Profiles**

Each DICOM printer can have different print layouts. The Layout-menu lists the set printer profiles. Scroll down the list to select the desired printer profile.

The print layout depends on the selected DICOM printer. The menu allows the user to set the print layout, the orientation, the size, medium type (sheet, film...), the color scale and the number of copies.

The option of the print key selection enables the print key for the DICOM printer to be visible on the screen.

> **Note**
>
> The DICOM Printer function requires the DICOM license.

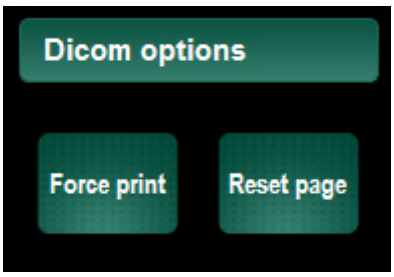
*DICOM Print Icon*

The DICOM print icon is displayed on the right upper part of the screen. Two numbers are displayed on the icon: the left number indicates the number of images sent to be printed and the right number indicates the number of images that can be printed in one sheet. In the example icon shown in the left: one image has been sent to the printer; the maximum number of images per sheet is four.

**DICOM Printer Management**

*DICOM Printer Icon*

The user can access the DICOM printer menu. Press on the icon and the system displays the following menu:




**Force Print**

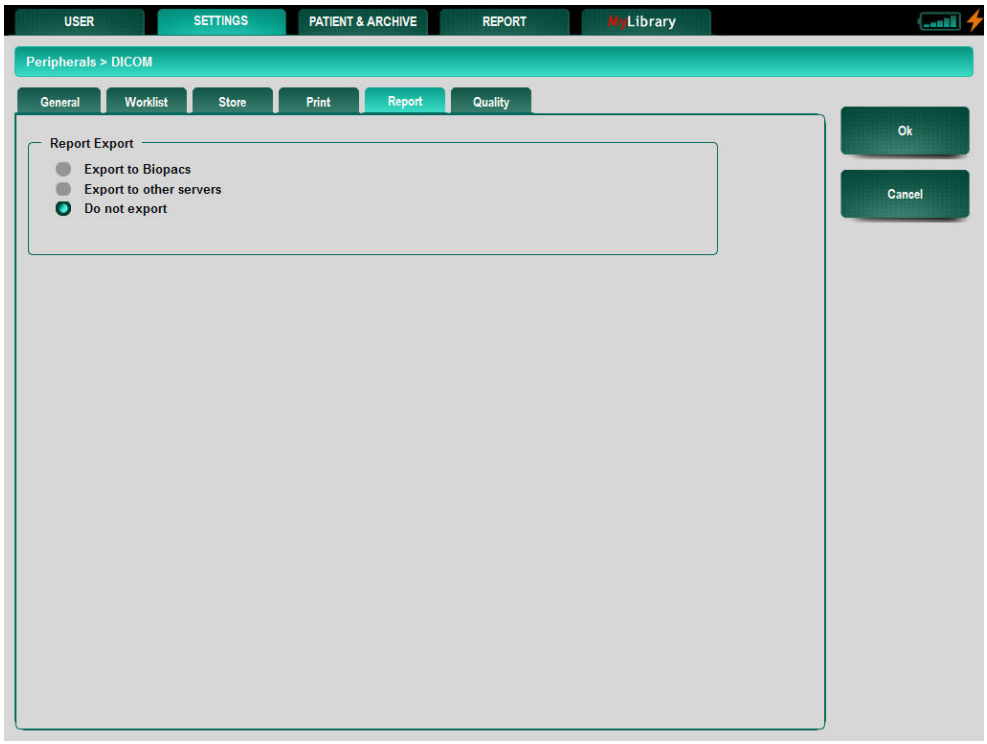
To print before formatting is complete, press the **FORCE PRINT** key to start printing.

**Reset Page**

The option cancels all the images sent to be printed: the image counter is automatically reset.

### Report

In this menu the choice can be made to include a report when exchanging data via DICOM.



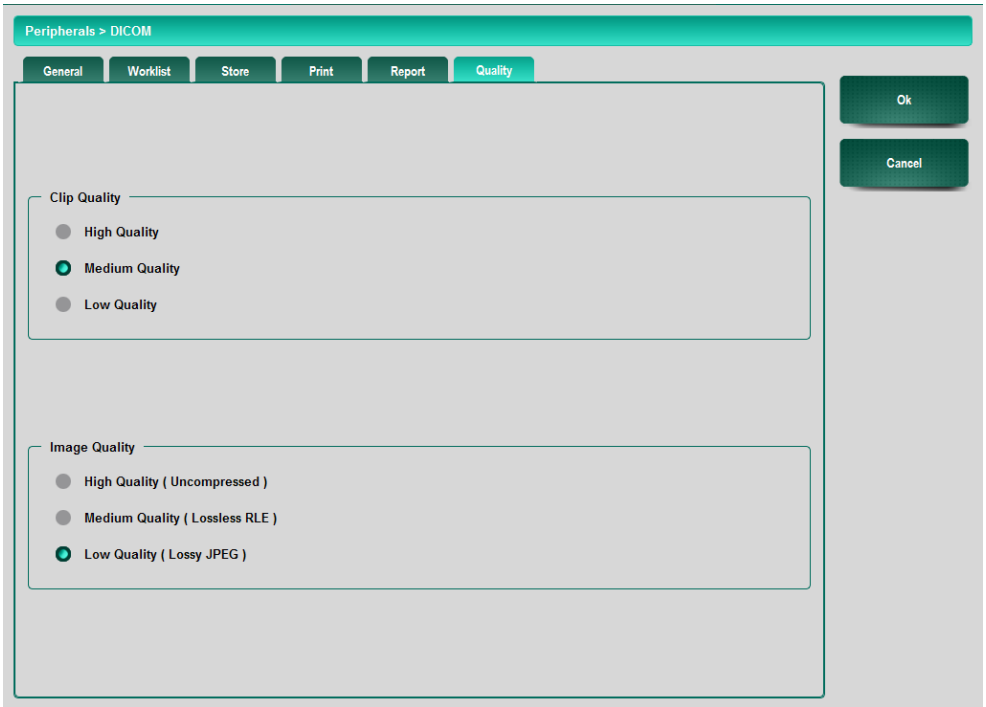

The following selections for the DICOM Report format are possible:

- Biopacs report. Biopacs is an Esaote product for ultrasound exam management.
- DICOM image format for other DICOM servers.
- On the same menu the user can set not to export the exam

### Quality

This option allows the user to set three different compression levels both for clips and for single images (image quality). The following values can be set: high quality (minimum compression), medium and low quality (maximum compression).

The set quality is used for any DICOM archiving operation (on server or on any other medium).




| Preset | Action |
|---|---|
| **Clip Quality** | Sets the quality (by setting the compression level) of the clips to be exported in DICOM. The higher the quality, the higher the memory required (and transfer time). |
| **Image Quality** | Sets the quality (by setting the compression level) of the images to be exported in DICOM. The higher the quality, the higher the size of the files. |

# Digital Printer

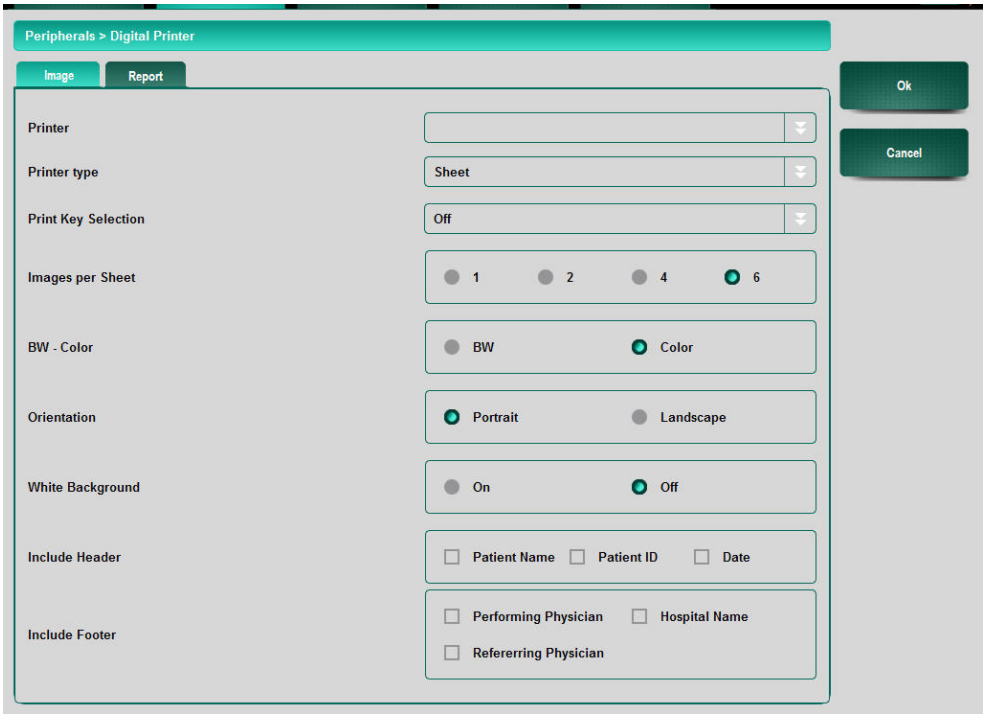
*For DICOM Printer configuration see further in this section.*

**MyLab** manages both laser and inkjet USB printers. Contact ESAOTE personnel for suggested models and assistance with proper configuration of the printer or visit ESAOTE website (www.esaote.com).

To access the configuration menu, choose **DIGITAL PRINTER**. Two tabs are shown in the following overview: **IMAGE** and **REPORT**.

### Image

Pressing the **IMAGE** key will give the following screen:




| Field | Action |
|---|---|
| **Printer** | This pull-down menu lists the digital printers that can be connected to the **MyLab**. |
| **Printer Type** | Enables the print key for the digital printer to be visible on the screen. |
| **Print Key Selection** | Sets the number of pictures that should be printed on one page. The images are sized properly accordingly. |
| **Images Per Sheet** | Sets the printer to print in color or BW. |
| **BW - Color** | Sets the orientation of the page (portrait or landscape). |
| **Orientation** | Sets the printer to print the parts of the pictures outside the ultrasound image in white. |
| **White Background** | Includes Physician Name and/or Hospital Name in the report page to print out. |
| **Include Header** | Includes Patient Name and/or Date in the report page to print out. |

### Format

The following print format icons are available, depending on the number of pictures set that should be printed on one page. The settings of images per sheet is described above.

*Print format icons*


The format icon gradually becomes blue as images are sent to the printer.

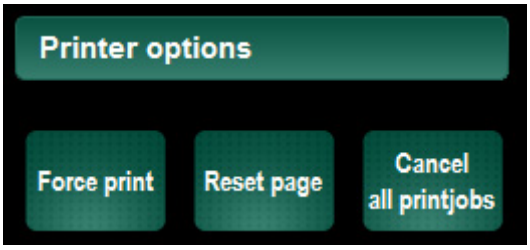
The figure displays the print format set on 3x2 and three images (colored in blue) are sent to the printer. Printing takes place when the icon is completely filled.

The printing function is also available off line, i.e. when the printer is not physically connected to the system. In this case, printouts are temporarily stored on the hard disk. Printing is automatically activated once the printer is connected.

**Digital Printer Management**

*Digital Printer icon*

The user can open the menu to manage the digital printer. Press on the icon and the system displays the following menu:




**Force Print**

To print before formatting is complete, press the **FORCE PRINT** key to start printing.

**Reset Page**

The option cancels all images sent to be printed: the image counter is automatically reset.

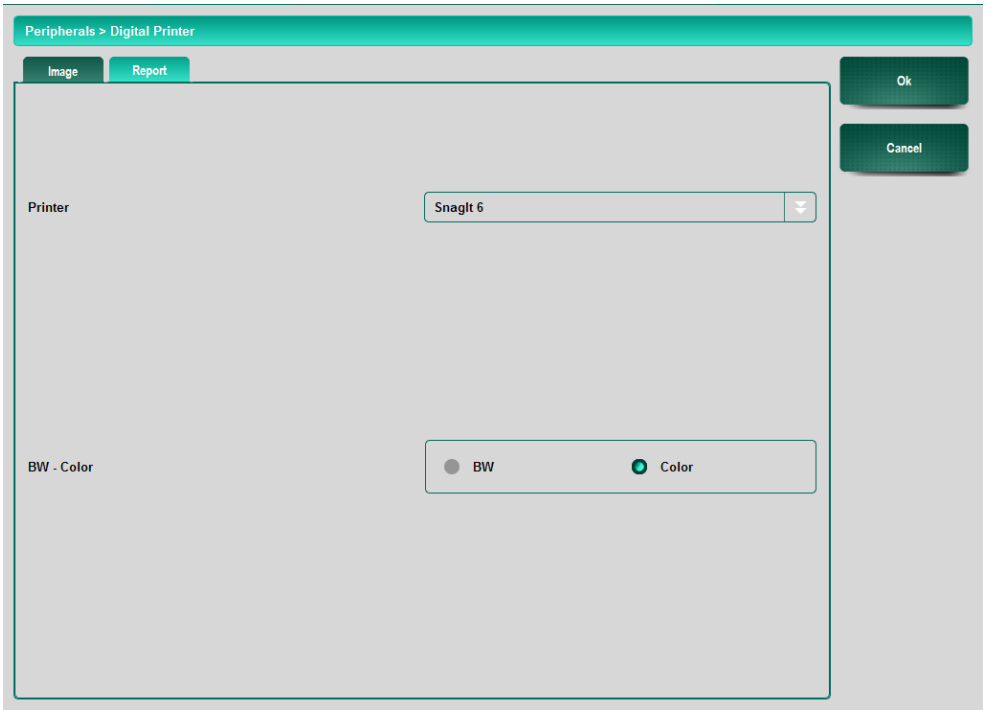
**Cancel all printjobs**

This option cancels all printjobs instantly.

**Report**

The Report page refers to the configuration of the printer that is used to print reports.

The **REPORT** tab will give access to the configuration screen of the report.



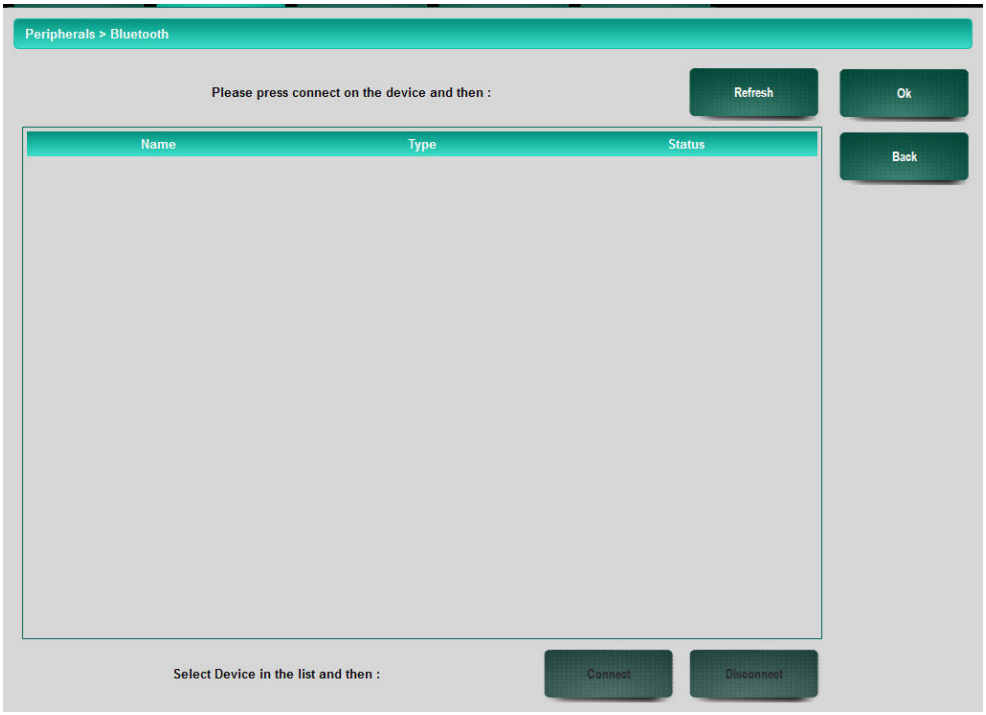

| Field | Action |
|---|---|
| **PRINTER** | Sets the printer model to be selected among the installed ones |
| **BW - COLOR** | Black/White or Color |

**CAUTION**

**Do not switch the system off until the printing stage has been completed**

# Wireless Connectivity

This is a protocol for exchanging data over short distances from fixed and mobile devices. Keyboards or mouse devices can be compliant with this protocol of the **MyLab** and can be connected to the system.




The list of devices recognized via the wireless protocol by **MyLab** is shown in the window.

The list can be refreshed by **REFRESH** button.

Given the list of devices, it is possible to enable the connection (by **CONNECT** button) or disable it (**DISCONNECT** button).

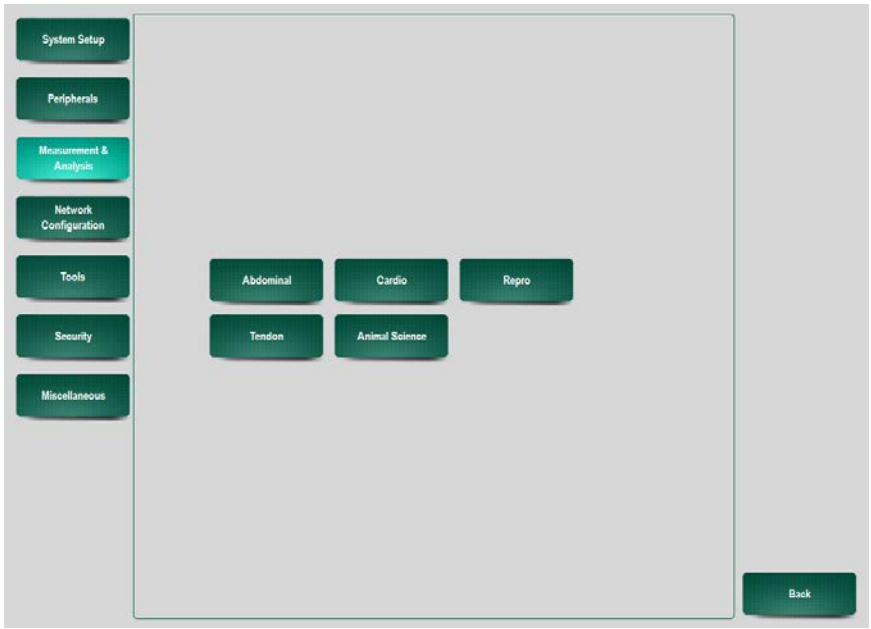
Chapter 4

# 4 - Measurements & Analysis

This chapter explains how to customize the calculation packages of each application, available when the **MEASURE** key is pressed. This section also lists the report editors for the application packages.

## Activating the Configuration Menu


To access the configuration menu, press **MENU** (under **SETTINGS** tab) and choose **MEASUREMENT & ANALYSIS**. When pressing the **MEASUREMENT & ANALYSIS** key the following screen is visible listing the applications whose packages can be configured:




AO

For the configuration and customization of the application packages please refer to the Calculations section of this manual.

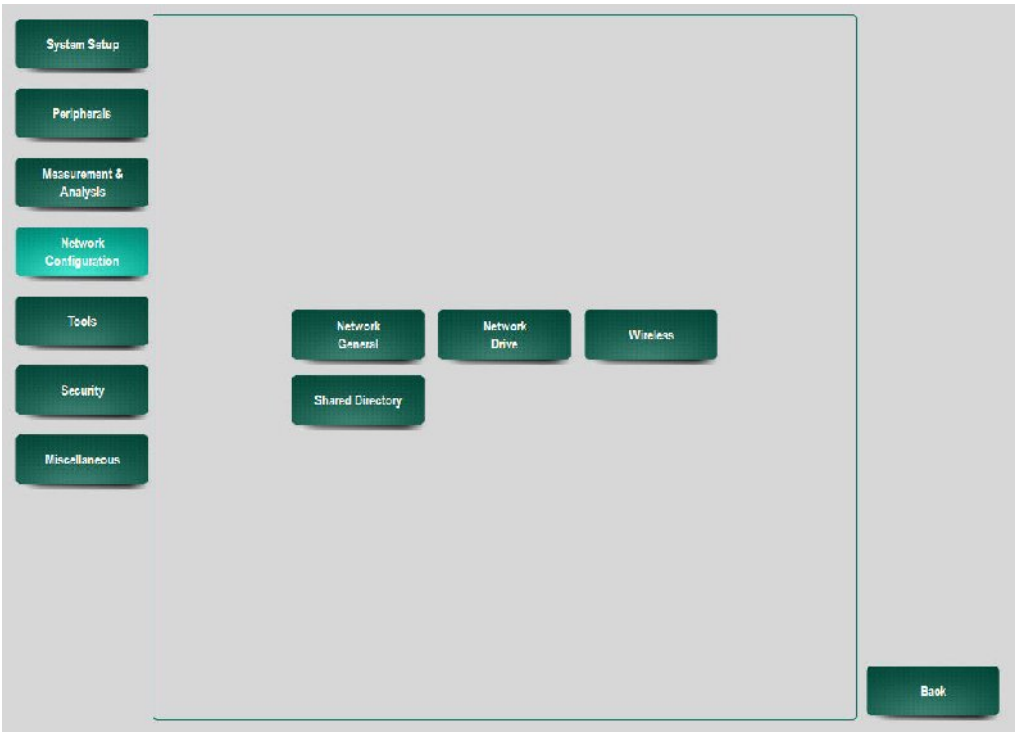
Chapter 5

# 5 - Network Configuration

This menu encloses four submenus:

- Network general
- Network drive
- Wireless
- Shared directory[1]

To access the configuration menu, press **MENU** (**SETTINGS** tab) and choose **NETWORK CONFIGURATION**. The following screen is then available:

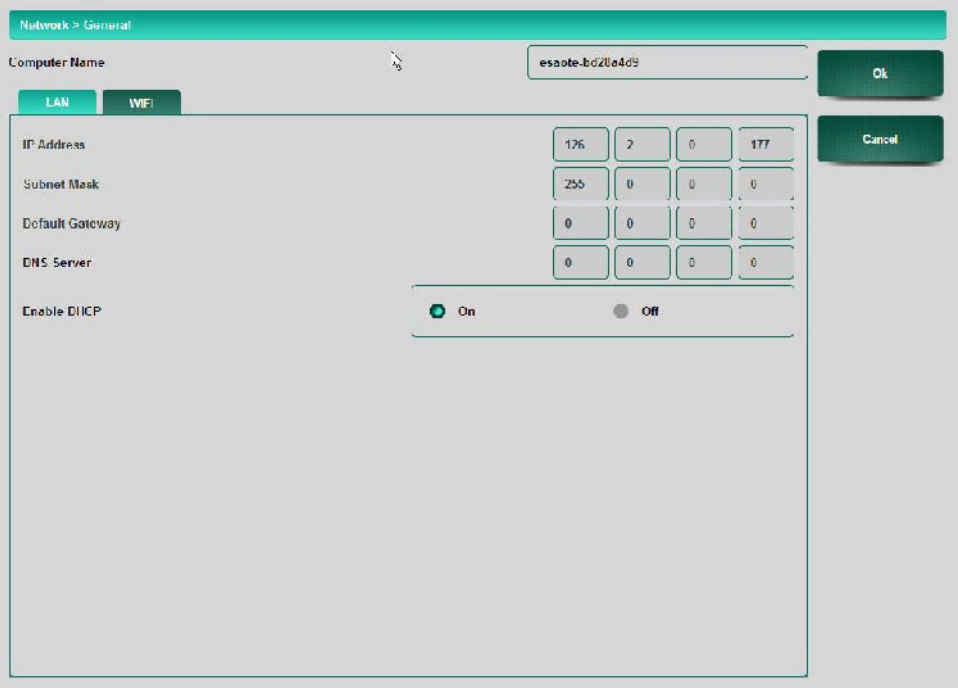




[1] This option is available for the **MyLabSatVet**

# Network General

This section explains the configuration settings that can be found for **LAN** and **WIFI**.

The General Network menu encloses two tabs: **LAN** and **WIFI**. Selecting the **LAN** tab will show the following window:




**Note**

The setup page under the **WIFI** tab is similar to the **LAN** tab.

| Parameter | Description |
|---|---|
| **Computer Name** | Sets the name of the scanner in the network. |
| **IP Address**<br>**Subnet Mask**<br>**Default Gateway**<br>**DNS Server** | These settings allow to configure the system in the network. |
| **Enable DHCP** | If DHCP is enabled, the system will acquire network configuration settings from the network server (if the server is enabled to provide this service).<br>If DHCP set off, network configuration settings have to be specified by providing IP Address, Subnet Mask and Default Gateway). |

**Note**

Please refer to the local network administrator for network data.

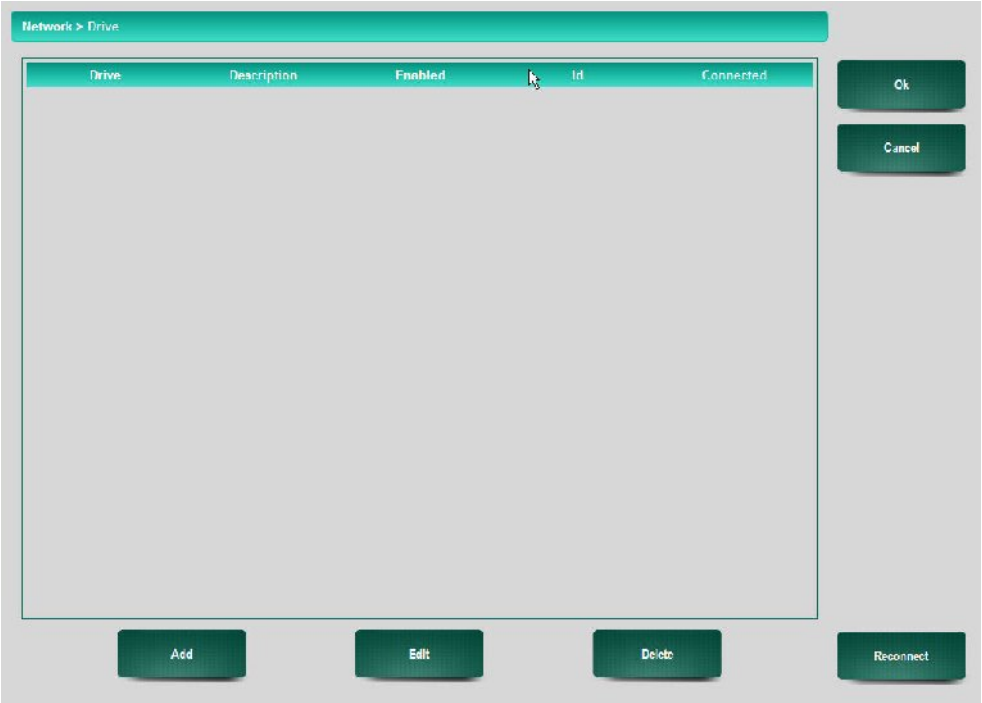
# Network Drive

This section explains how to configure the network drives that can be used as archiving media.

### Network Drive Configuration

The Network Drive option allows the user to select a shared folder in the network as destination driver for image or report export.

Once selected the option, the system displays the following window:




The Network Drive window lists the network drivers configured and available as destinations in the system.

In this environment it is possible to:

- Add a new network driver
- Delete an existing network driver
- Update the data of an existing network driver (Edit)
- Reconnect to a previous selected network

**Note**

The network has to be configured before setting network directory: see the "Archive" section for further details.

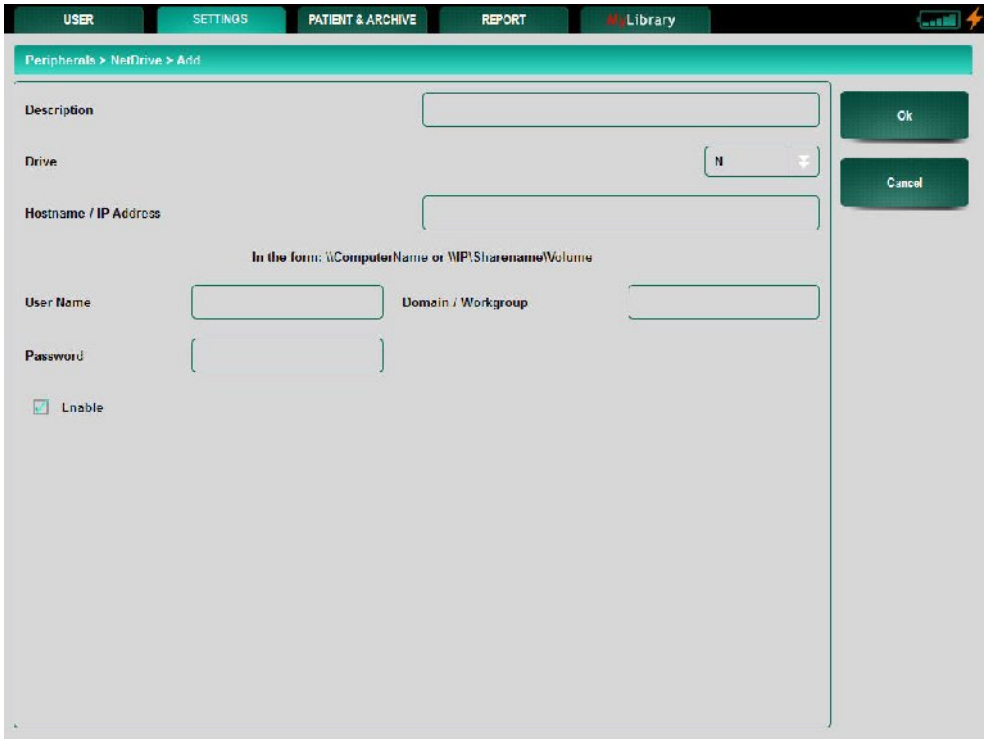
Please refer to the local network administrator for network data.

To add a new shared folder press **ADD** button and compile the following form.

**Procedure**

- Press the **ADD** button.

The network directory configuration window is displayed:




| Parameter | Description |
|---|---|
| **Description** | Name of the shared folder. |
| **Drive** | Name of the drive associated to the folder. |
| **Hostname/ IP Address** | Network Path or IP address of the shared folder. |
| **User Name** | Username to access the shared folder through network (according to the network configuration). |
| **Password** | Password to access the shared folder through network (according to the network configuration). |

**Note**

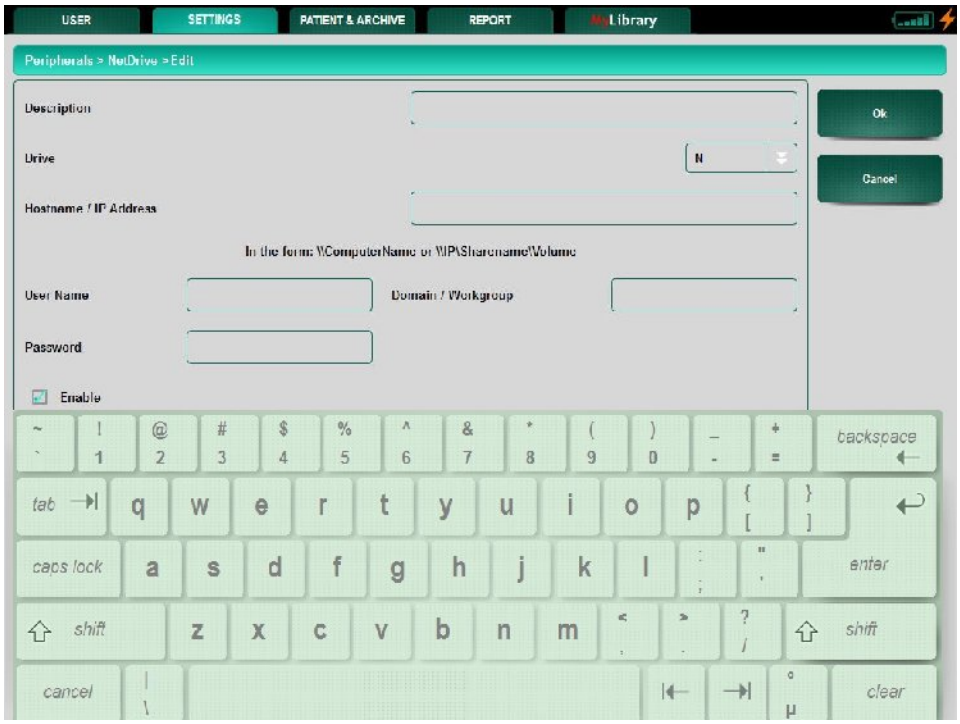
Please refer to the local network administrator for network data.

**Procedure**

To update an existing shared folder:

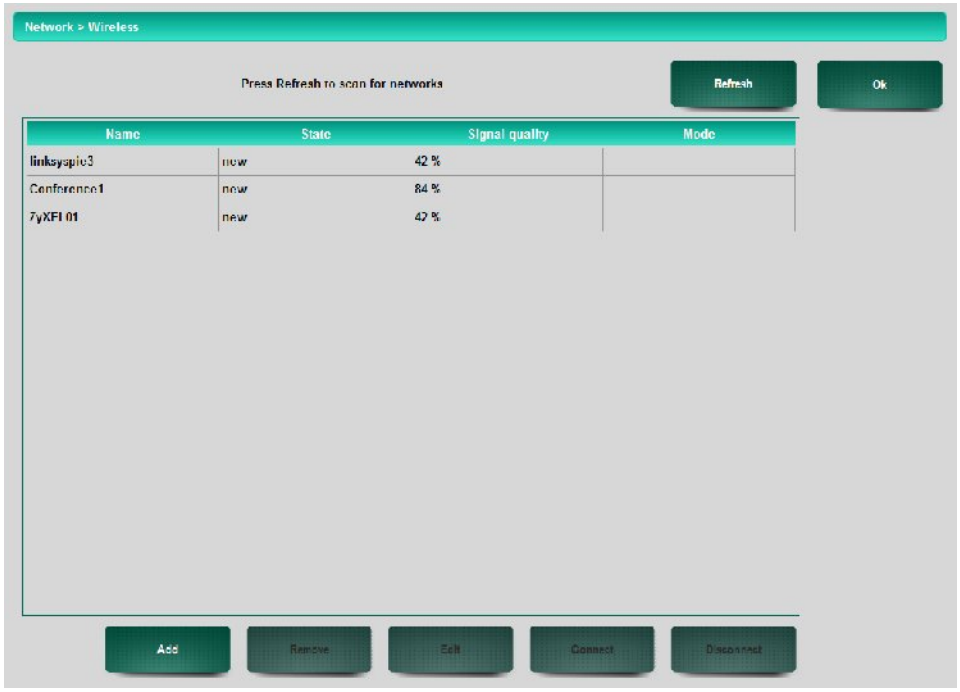
- Select the folder and press the **EDIT** button

Update the driver information in form as shown below.




## Wireless

Pressing the **WIRELESS** key in the **NETWORK CONFIGURATION** menu will activate the following screen:



| Parameter | Description |
|---|---|
| **Name** | Name of the network. |
| **State** | If a network is available, unavailable or new. |
| **Signal quality** | Shows the signal strength of the network. |
| **Mode** | Shows whether the connection of the network is automatic or manual. |

The screen shows a table with all the available networks listed. The signal quality depends of the position of the system in the area. The **REFRESH** key can be used to restore signal strength of the available networks. The **BACK** key returns to the menu. Any actions performed on this page will NOT be canceled

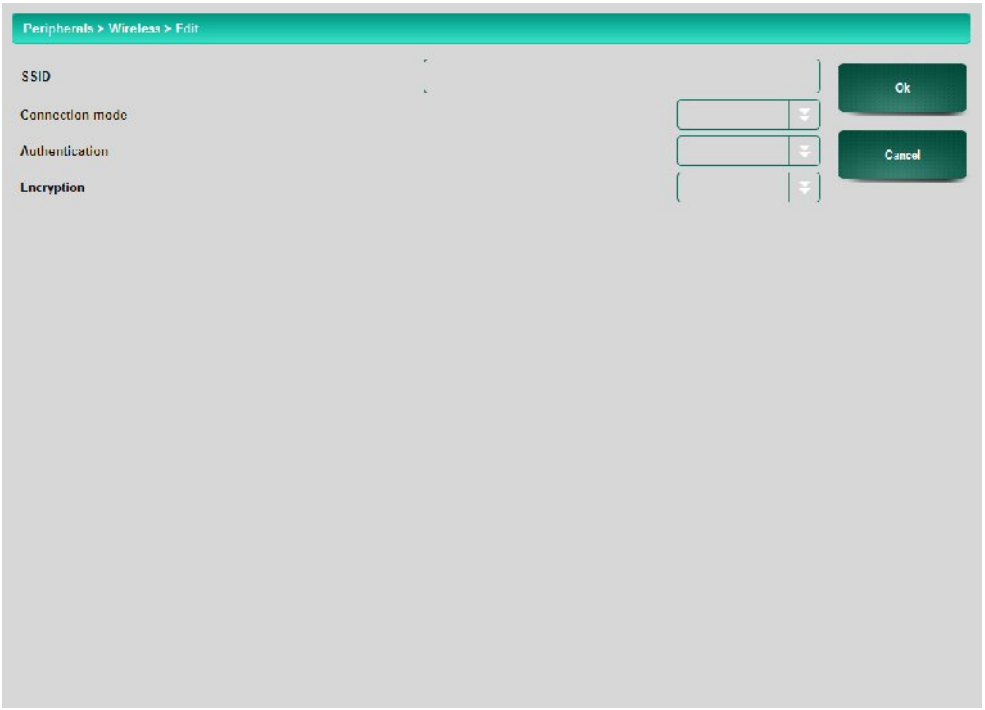
The user can add a Network by pressing the **ADD** button. Pressing the **EDIT** key allows to modify an existing network.

To add a new network press **ADD** button:

**Procedure**

- Press the **ADD** button.

Fill in the following form

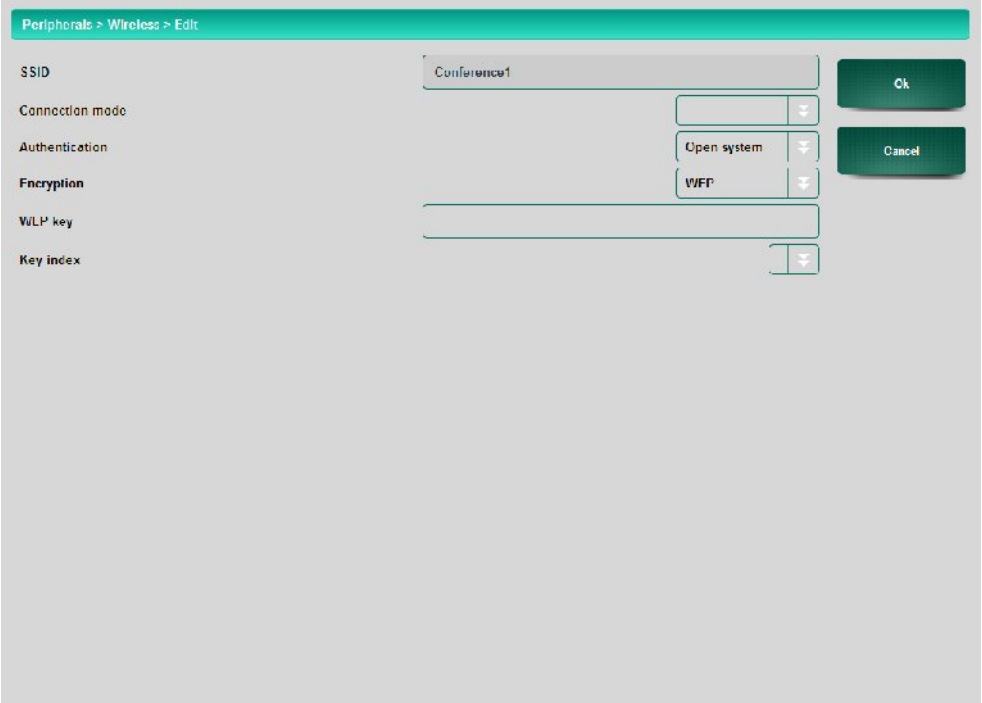



To update an existing shared folder:

**Procedure**

- Select the folder in the list
- Press the **EDIT** button

Modify the data in the following form




| Parameter | Description |
|---|---|
| **SSID** | The user can enter the name of a Wireless network. |
| **Connection Mode** | The network can be set to automatic or manual connection. |
| **Authentication** | Two methods of authentication can be used: Open System authentication and Shared Key authentication, or other security protocols. |
| **Encryption** | The encryption type depends on the authentication that is chosen. |

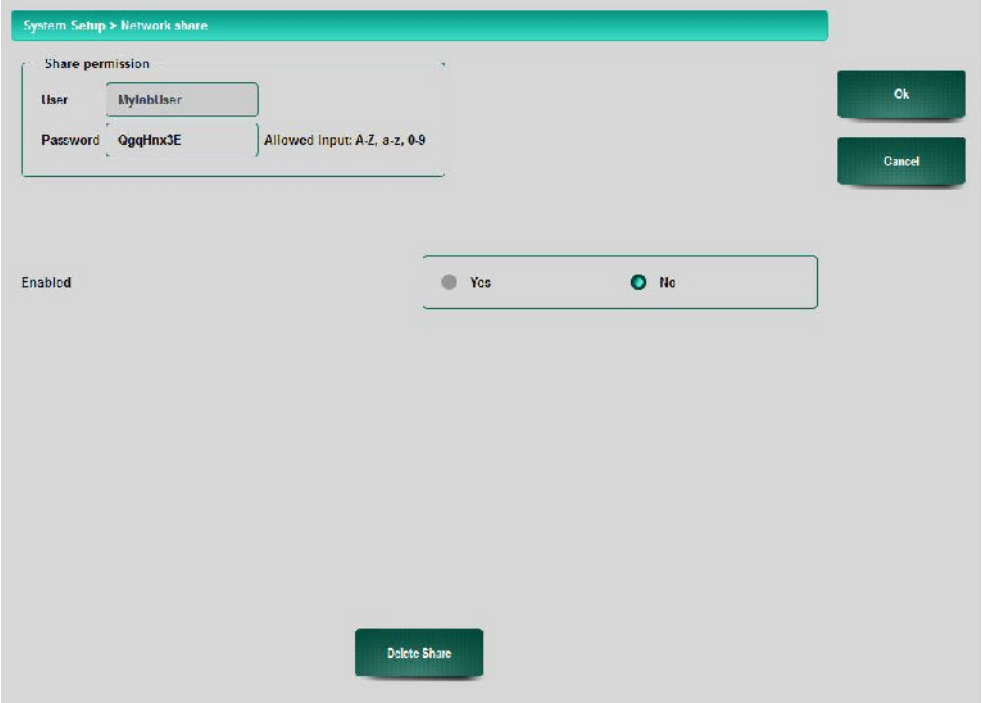
**Note**

Please contact the network administrator before continuing with procedure.

## Shared Directory[2]

When the **SHARED DIRECTORY** key is pressed in the Network Configuration menu, the following screen appears:

[2] This option is available for the **MyLabSatVet**




Information can be shared between the **MyLabSatVet** and the **MyLabTwiceVet** with the creation of a shared directory. In order to do so, both systems need to be connected to the network.

This connection can be configured in the window Network Share:

**Procedure**

- Enable the connection by clicking YES
- Press **OK** in order to activate the shared directory

All data (clips, images, reports) that is saved on the **MyLabSatVet** will automatically go to this shared directory. The **MyLabTwiceVet** can access this directory via the Network Drive by entering the similar password as in the **MyLabSatVet**.

The **DELETE SHARE** key can be used to erase the data in the shared directory.

Chapter 6

# 6 - Tools

This menu includes the Protocol Editor.

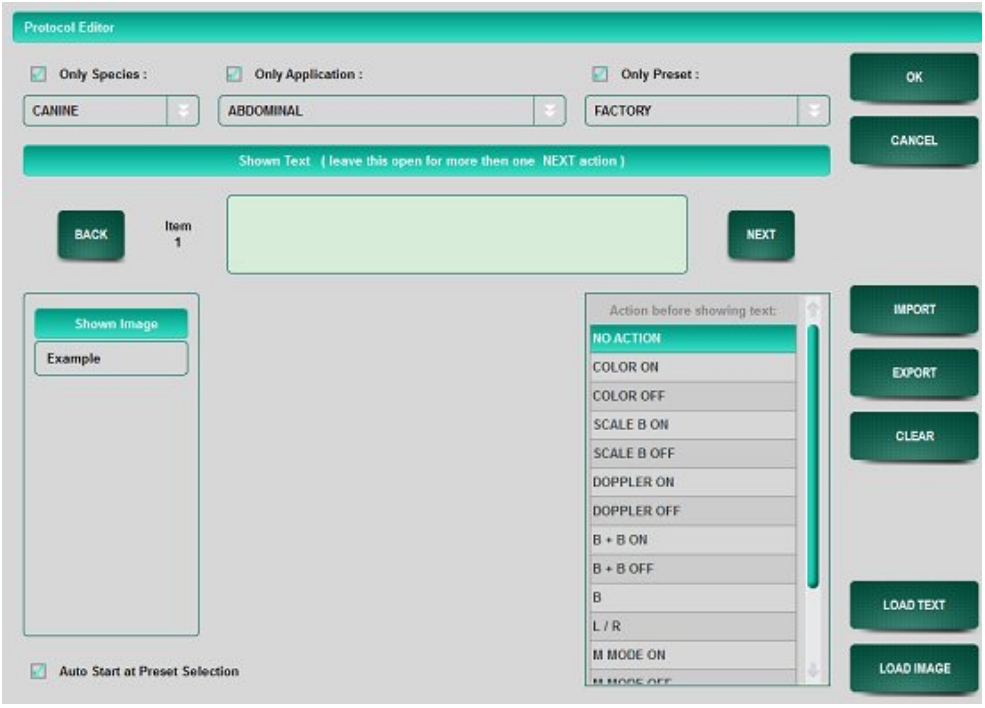
To access the configuration menu, press **MENU** (under **SETTINGS** tab) and choose **TOOLS**. The following screen is then available:


## Protocol Editor

This section explains how to create and configure protocols in the system.

A protocol is a sequence of messages and/or actions that can be defined by a user to support procedures.

To access the Protocol Editor menu, press **SETTINGS** tab and choose **TOOLS**. Press the **PROTOCOL EDITOR** key to activate the setup environment.




**Protocol Editor Configuration**

The screen is organized in several editor sets.

*Activation of Protocol*


This section defines whether the protocol has to be associated to the application or to a specific preset in the application.

In these cases the relative selections have to be made inside the checkboxes and the pull-down menus.

- Depending on the selection made by the user, the specific selections apply. E.g. if "Only Species", "Only Application" and "Only Preset" are all enabled, the protocol will be active for those specific species, application and preset, or if "Only Species" is enabled, the protocol will be active for that specific species, but for all applications and presets included.

At the bottom of the page, the checkbox "Auto-Start at Preset Selection" is present. This setting activates the protocol at the selection of the preset at the beginning of the procedure.

*Protocol Configuration*


**BACK** and **NEXT** buttons select the step of the protocol to define (by text and actions).

The text field allows the user to edit text to be displayed on the screen when the specific step is reached during the procedure.

Shown image field provides information over the figure to be displayed at the specific step.

The section "Action before showing text" lists all the possible actions that can be enabled during the procedure when the specific protocol step is reached.

**Note**

The first item cannot be allocated with an action. The first item can only be allocated with a text message, an image or a sound.

*Configuration Procedure*

To start editing, the user must first input text. Pressing on the text field will make the keyboard appear. Press the **NEXT** key to continue with the following item.

From this point, the user can choose to allocate text **AND/OR** an action **AND/OR** an image **AND/OR** a sound.

*Action*

Choose an action by highlighting it first and then press the **NEXT** key to continue.

*Images*

An image can be uploaded via USB by using the **LOAD IMAGE** key. Connect a USB to the system. The system will show a list of images available in the USB medium.

A preview is shown on the right of the screen. Choose an image and press the **OK** key. An example of the image is shown on the left side of the Protocol Editor screen. Text can also be added beneath the image; press on the text field and the keyboard will appear. Press the **NEXT** key to continue.

The user can scroll through all the edited items by using the **BACK** and **NEXT** key.

*Advanced Functions*


**IMPORT** and **EXPORT** buttons permit to import / export a protocol from / to another **MyLab** unit. To export a protocol, connect a USB to the system and press the **EXPORT** key. If preferred, the user can change the name by keyboard. Press **OK** to confirm.

To import protocols, connect a USB to the system and press the **IMPORT** key. Choose a protocol from the list and press **OK**.

**Note**

Only one protocol at time can be imported. When the protocol is assigned to the application and/or preset, the protocol will be saved. Similar allocations of protocols to applications and/or presets will be overwritten.

**CLEAR** button erases the protocol in the specific unit.


**LOAD TEXT** and **LOAD IMAGE** buttons permit to load text or an image from USB media. The text or the image will be added to protocol at the specific step.

At the end of the protocol definition, press **OK** and **CANCEL** buttons to close the protocol editor confirming or not confirming the modifications.

### Starting the protocol

The protocol sequence will start as defined in the configuration (at the selection of the preset, etc) and be visible at the bottom of the screen in real time.


To move to the next step of the protocol press the **NEXT** key.

If images are edited with text, they will be displayed on the left side of the screen.

Pressing the **CLOSE** key ends the protocol.

Chapter 7

# 7 - Security

Access to the system and to the archive can be reserved only to authorized users. In this case access to the system can be managed via password.

The access under password allows a secure management of the archive: its data can be reviewed and modified only by authorized personnel.

This chapter explains the archive security management offered by **MyLab** and how to define the list of the authorized users.

## Users Accounts

Two different accounts are available: administrator and user.

The system administrator can decide whether to activate the security or not. When enabled, he can add, delete users and define their profiles. More administrators can be defined.

**Note**

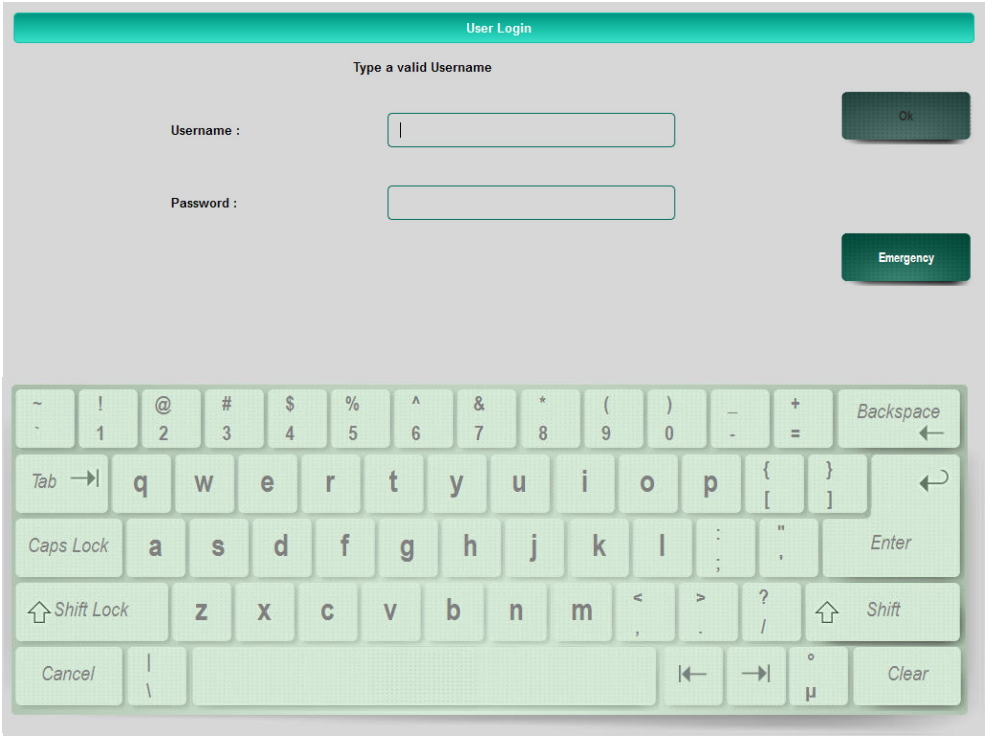
The default administrator user name and password are: ADMINISTRATOR and MYLAB. Change this account if the security management is activated.

## Security Access to the System

When security is enabled, a password is required to access the system. When starting up, the system requires user name and password.

**Note**

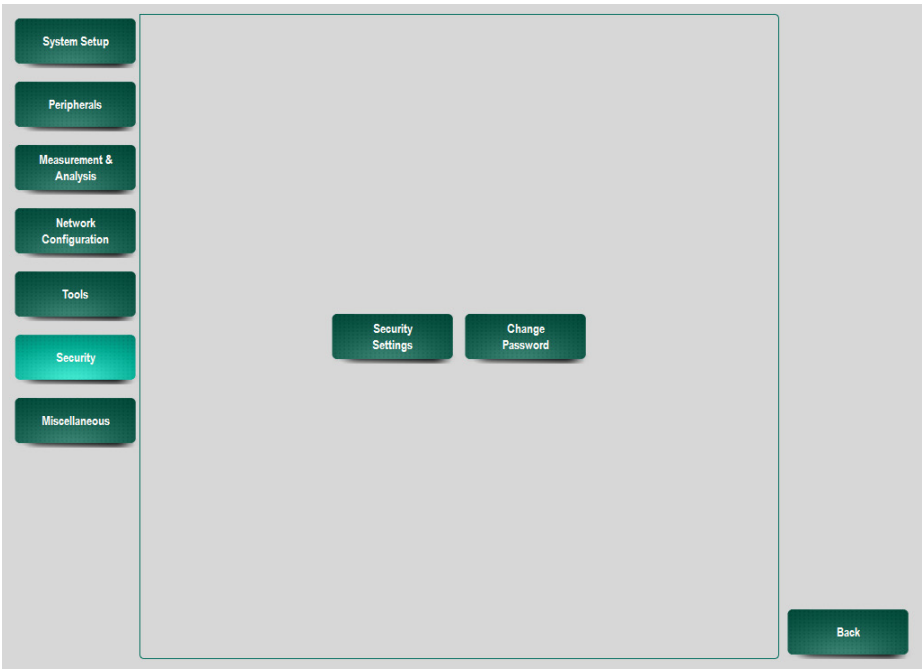
The system is case sensitive; please consider this when entering passwords.




When the **EMERGENCY** key is active, exams can be performed (Emergency Access 'On') without entering any user name and password. The Emergency Access allows performing exams and review images saved during the current exam, but will not allow access to the Archive (**PATIENT & ARCHIVE** key).

# Security Configuration


The **SECURITY** key includes two option keys: **SECURITY SETTINGS** and **CHANGE PASSWORD**. The last folder is displayed only when the security is enabled.

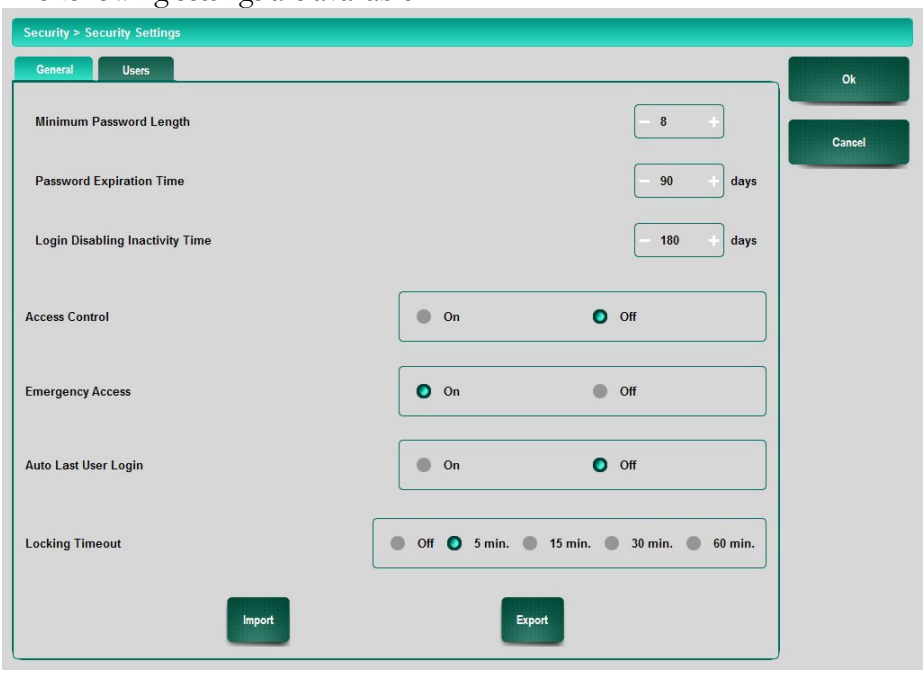



### Security settings

Only administrators can access this option. The configuration menu has two tabs: **GENERAL** and **USERS**.

### General Tab

The following settings are available:

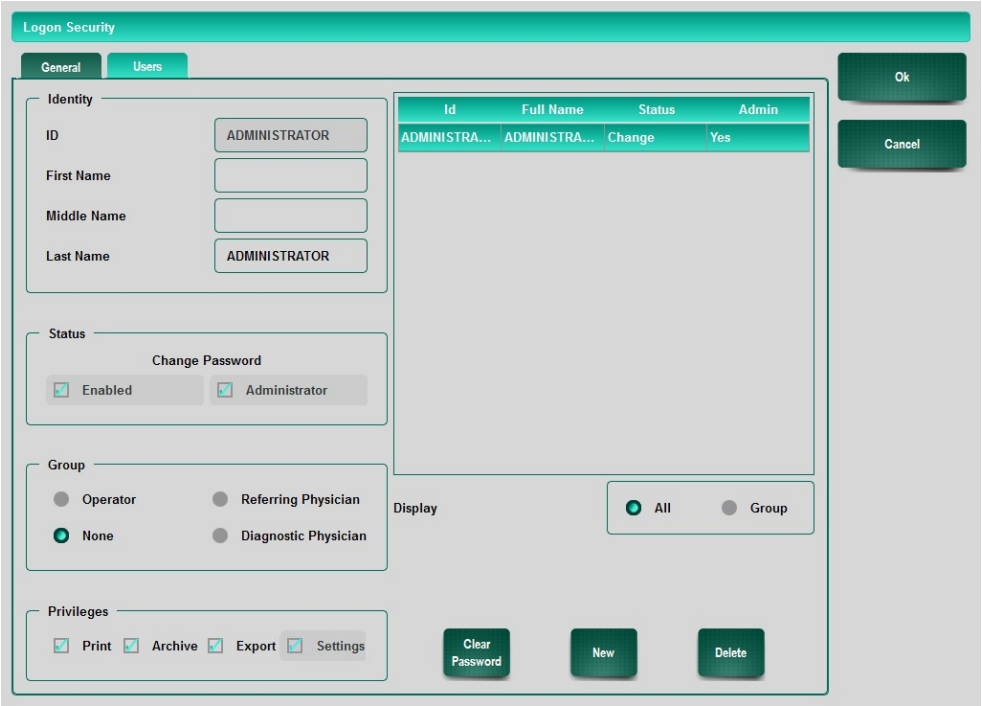


| Field | Action |
|---|---|
| **Minimum Password Length** | Sets the minimum number of characters for the password (maximum 20). |
| **Password Expiration Time** | Sets the time (in days) after which the password expires. |
| **Login Disabling Inactivity Time** | Sets the inactivity time (in days) after which the account automatically expires. |
| **Access Control** | Enables/disables the security access by password. |
| **Emergency Access** | Enables / disables the emergency access. |
| **Auto Last User Login** | Enables / disables automatic access with the last user authenticated in the system. |
| **Locking Timeout** | Sets the time (in minutes) after which the system will lock, when current user didn't use the system. |

*Saving the configuration*

The settings can be saved on USB medium when the **EXPORT** key is pressed.

**Users Tab**




User accounts can be added (**NEW** key), or deleted (**DELETE** key).

**Note**

It will be required to enter a new password at once when a new user is added.

A new user account is identified by "ID", "First name", "Middle name" and "Last name". The user can be set as administrator when the relevant box is checked.

The Status field allows to enable a certain user and defines whether a user acquires administrator rights.

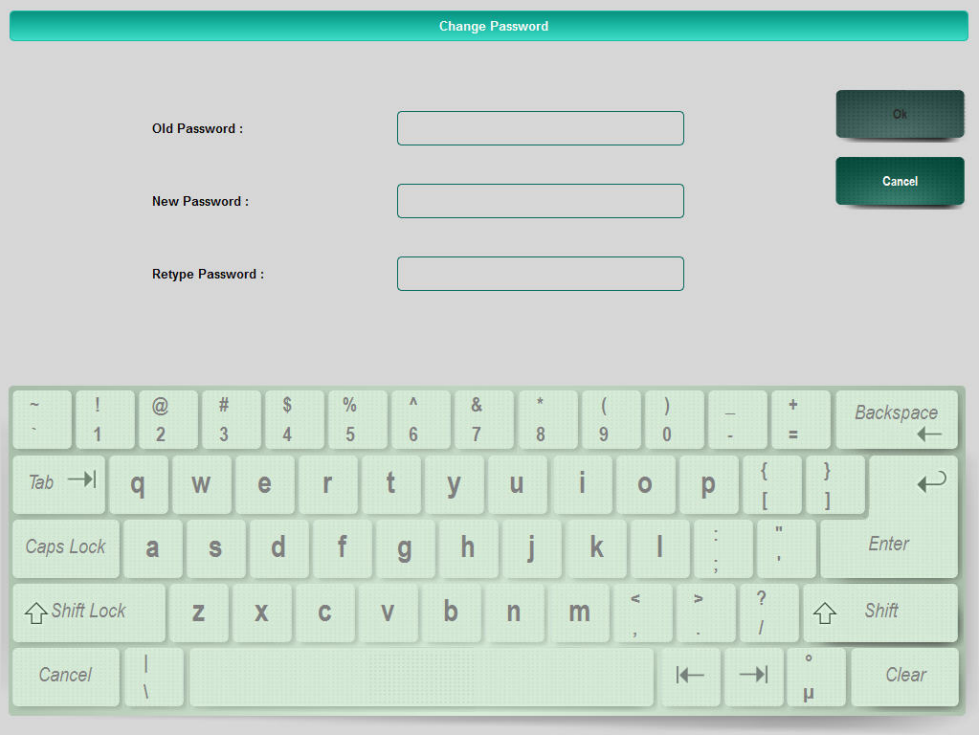
The **CLEAR PASSWORD** button allows to change the password for existing users.

Users can be assigned to specific groups: Operator, Referring Physician or Diagnostic Physician. This function can be activated to display a list of users. If no allocation is preferred, choose the option 'None'.

The privileges section allows the user to be able to access certain modules, such as Printing, Archiving, Exporting and access to the Settings page.

**Change password**

This option is available for all authorized users and allows to change the password. Old and new passwords have to be inserted.

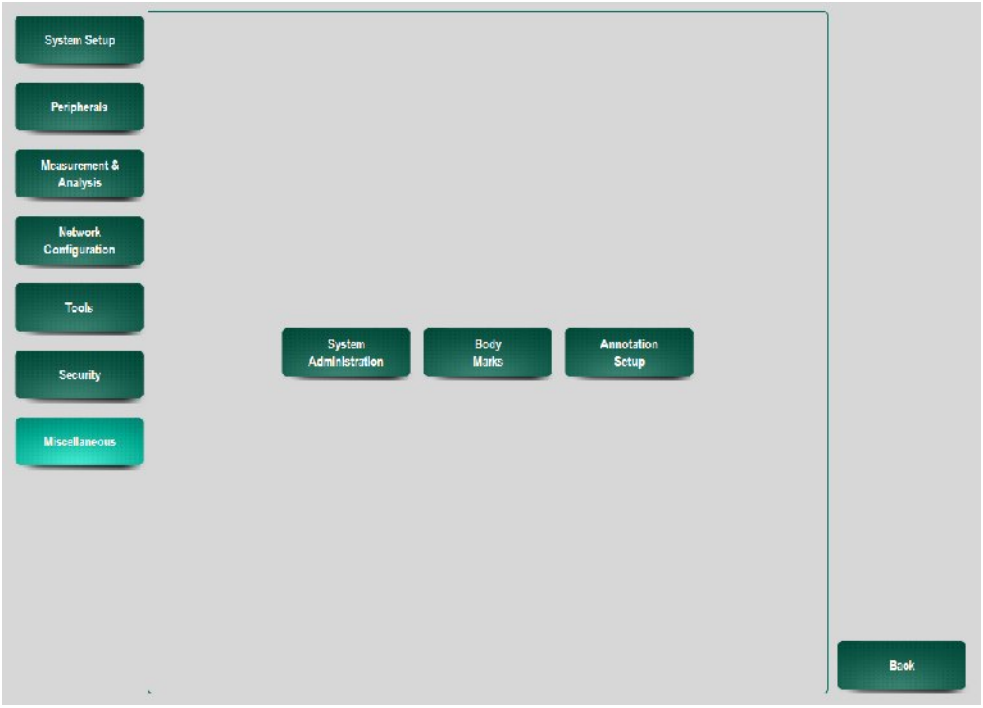


Chapter 8

# 8 - Miscellaneous


The Miscellaneous section encloses the following configuration pages:

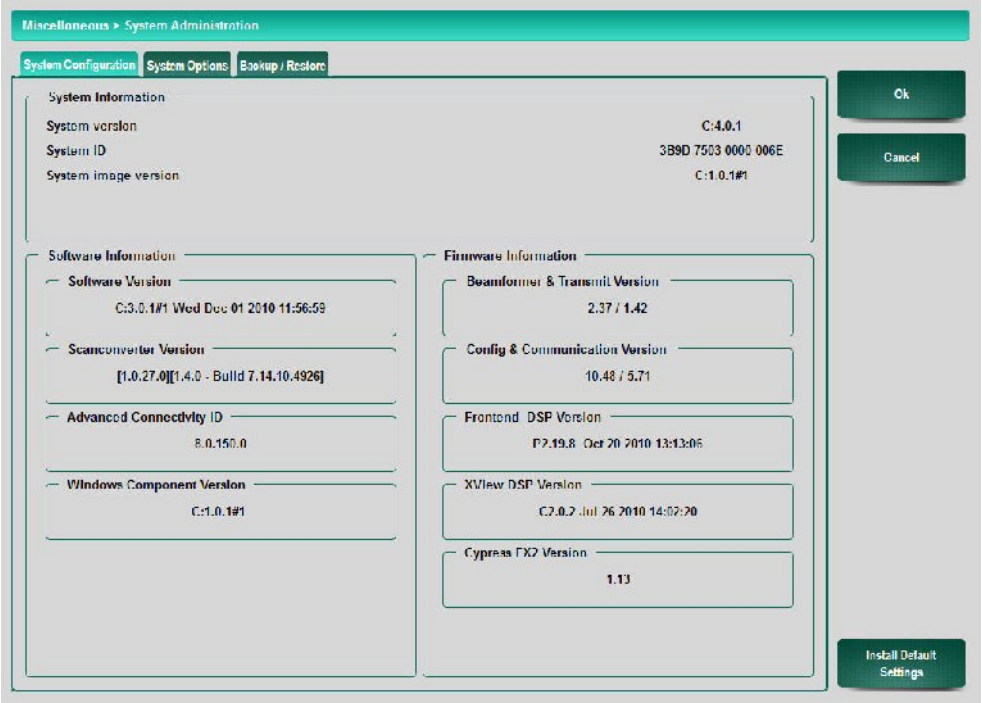
- System Administration
- Body Marks
- Annotation Setup




## System Administration

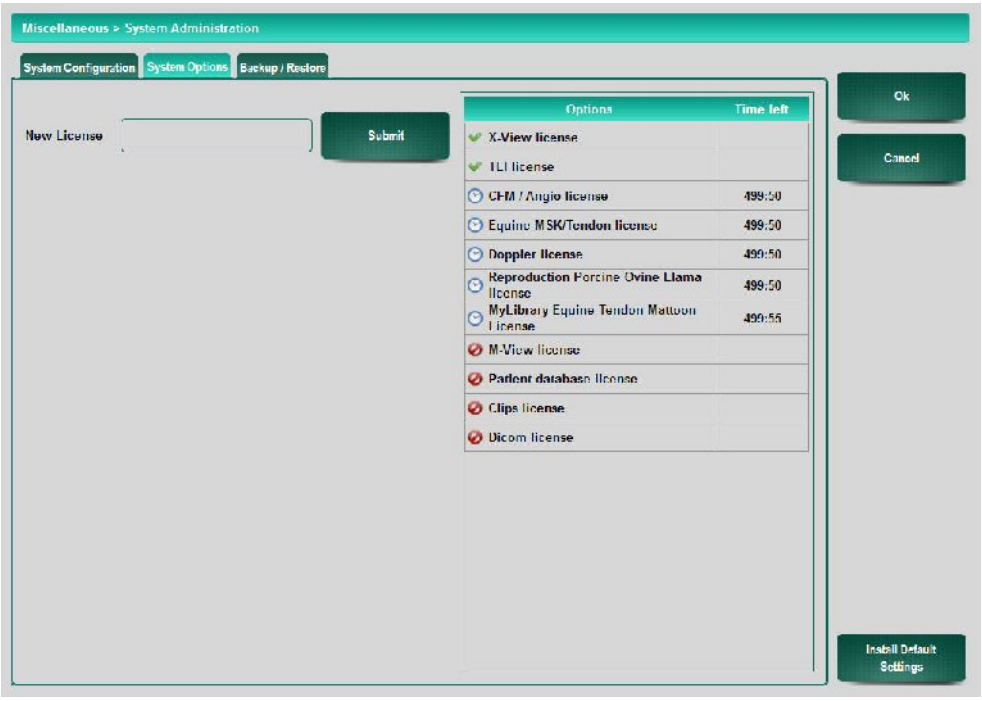
**System Configuration**

This option provides information about the system Hardware, Software and Firmware configuration.




**System Options**

This tab summarizes the status of the system licenses. The user can activate licenses by selecting them and entering the relative license code.




License codes are generated according to the Hardware ID of the system: different codes cannot activate the same license.

If a demo license has been activated, this shows the time left.

The Options page lists all the options/licenses of the **MyLab** and their status (enabled / demo license / disabled ). When an option is enabled, it is indicated by a green check mark.

In order to enter a new license, perform the following steps:

**Procedure**

- Select the option to be enabled in the Options list.
- Edit the license code in the New License field.
- Press **SUBMIT**.

If the number is correct, the status will change into a positive check and the license becomes instantly functional.

Please consider that the system is case sensitive.

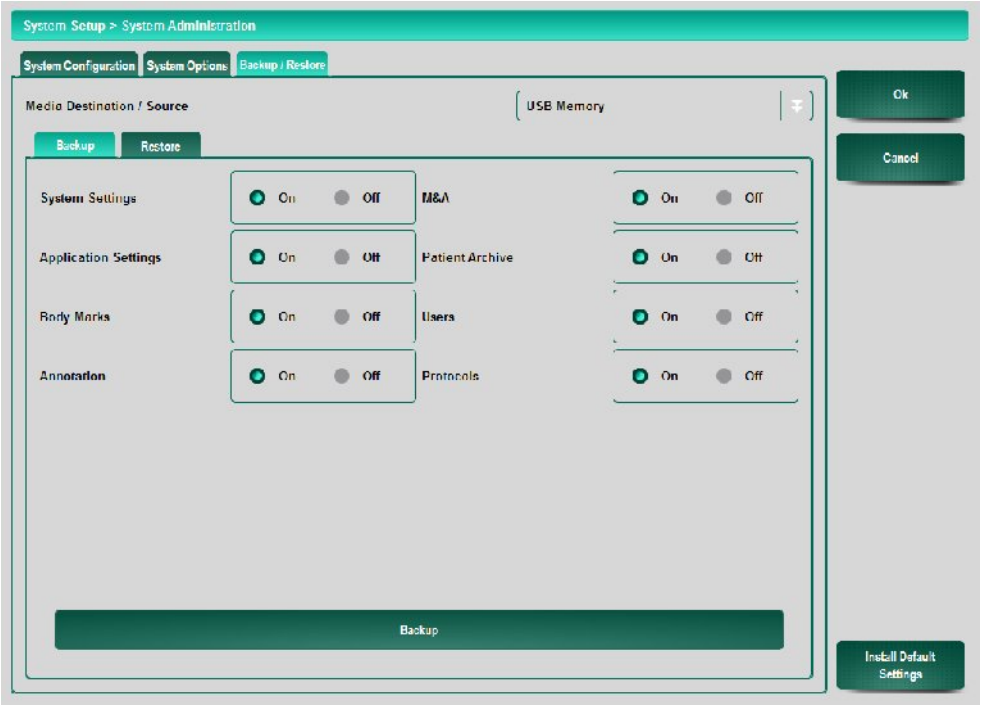
### Backup / Restore

This chapter explains how to backup and restore the user presets. The Backup/Restore function allows the user to save the settings and customizations on a USB memory drive and reload them on **MyLab** systems.

#### Backup

This option is used to back up all user settings on a USB medium. In the menu, press on the **MISCELLANEOUS** key, choose **SYSTEM ADMINISTRATION** and then the **BACKUP/RESTORE** tab.

The list of groups and types of settings that can be saved are listed in the page and can be selectively activated for the backup operation.



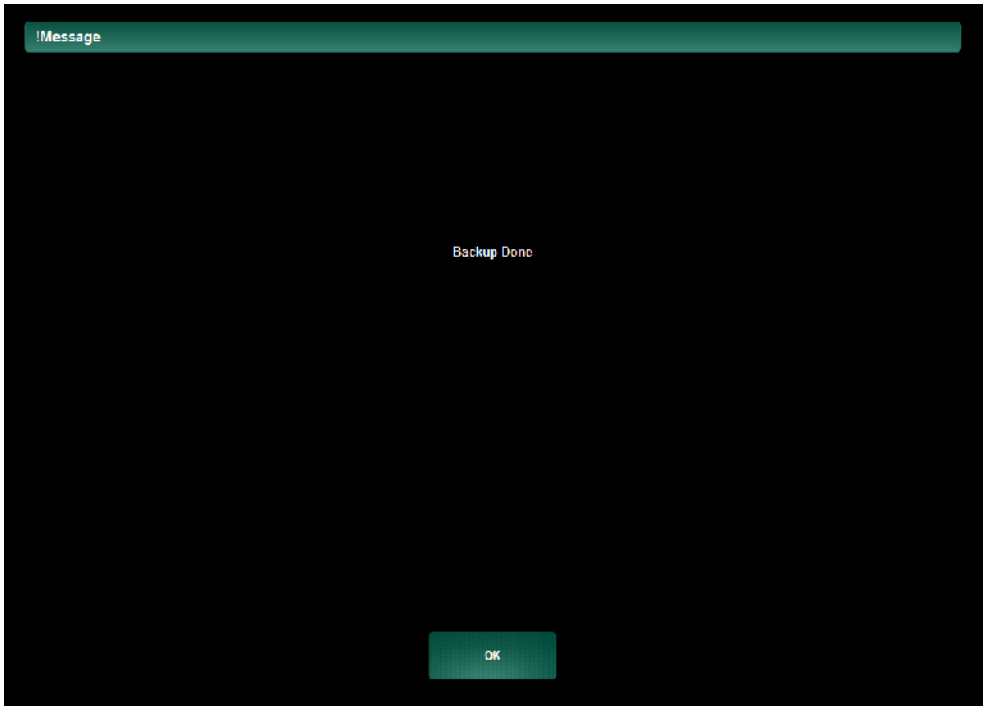

The settings that can be backed-up and restored are:

| Preset | Action |
|---|---|
| **System Settings** | Backs up/restores all configurations of the "System Setup" menu options. |
| **Application Settings** | Backs up/restores all configurations of the "User Presets" menu options. |
| **Body Marks** | Backs up/restores all configurations of the "Body Marks" menu options. |
| **Annotation** | Backs up/restores all configurations of the "Annotation Setup" menu options. |
| **M&A (Measurement & Analysis)** | Backs up/restores all configurations of the "Measurement Units", "Generic Measurements", "Report layout" and the "Archive and Export Settings" menu options. |
| **Patient Archive** | Backs up/restores all configurations of the "Patient database" menu options. |
| **Users** | Backs up/restores all configurations of the "General Security Settings" menu options. |
| **Protocols** | Backs up/restores all configurations of the "Protocols" menu options. |

**Procedure**

Connect the USB medium to the system and press the **BACKUP** key to start backup. Please wait till when the procedure is finished.

When the procedure is finished the following screen will be shown:



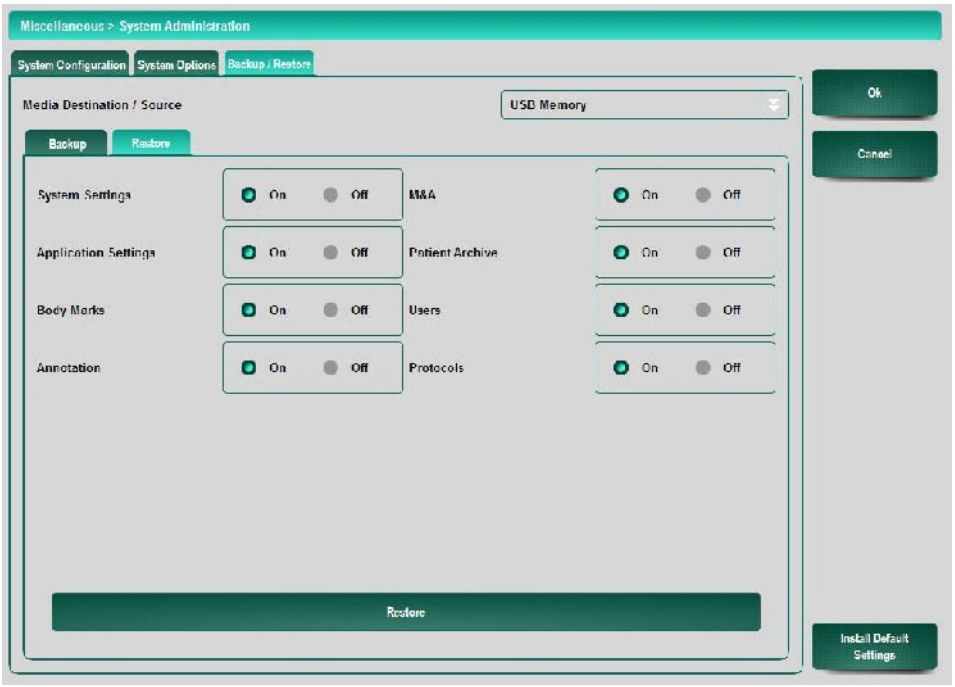

Press the **OK** key to continue.

**CAUTION**

**The INSTALL DEFAULT SETTINGS key will restore all settings to factory settings with loss of all user modifications.**

**Restore**

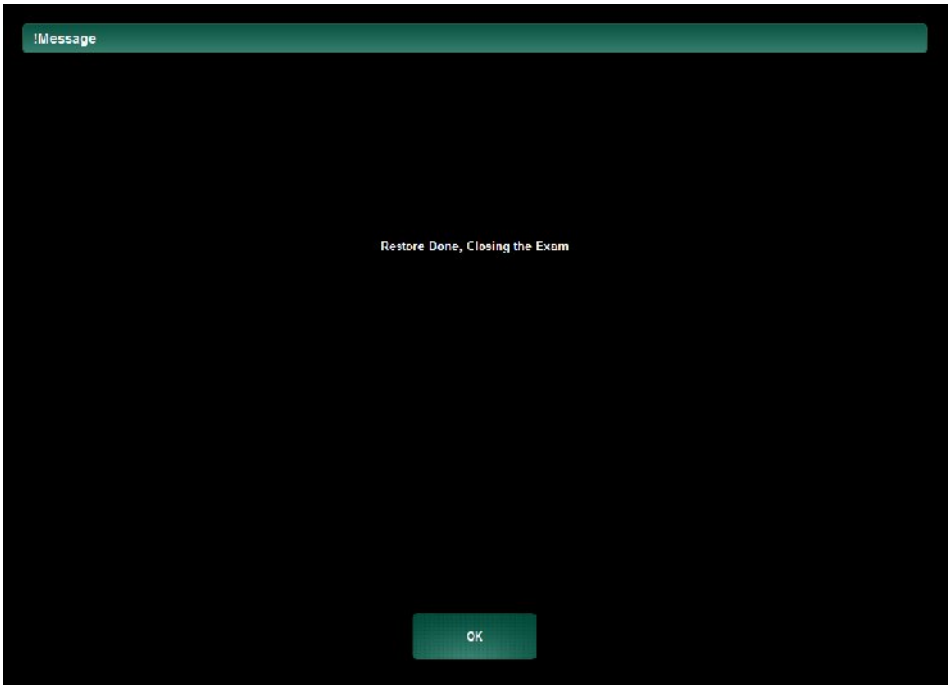
The backed up presets can be restored into **MyLab** units.




It is possible to restore specific user presets: the system lists the user presets that can be restored.

Connect the USB medium to the system and press the **RESTORE** key to start restoring. Please wait until the procedure is finished.

When the procedure is finished the following screen will be shown:



Press the **OK** key to continue.

**CAUTION**

**The restored presets completely overwrite those on the system: the previous presets are then lost.**

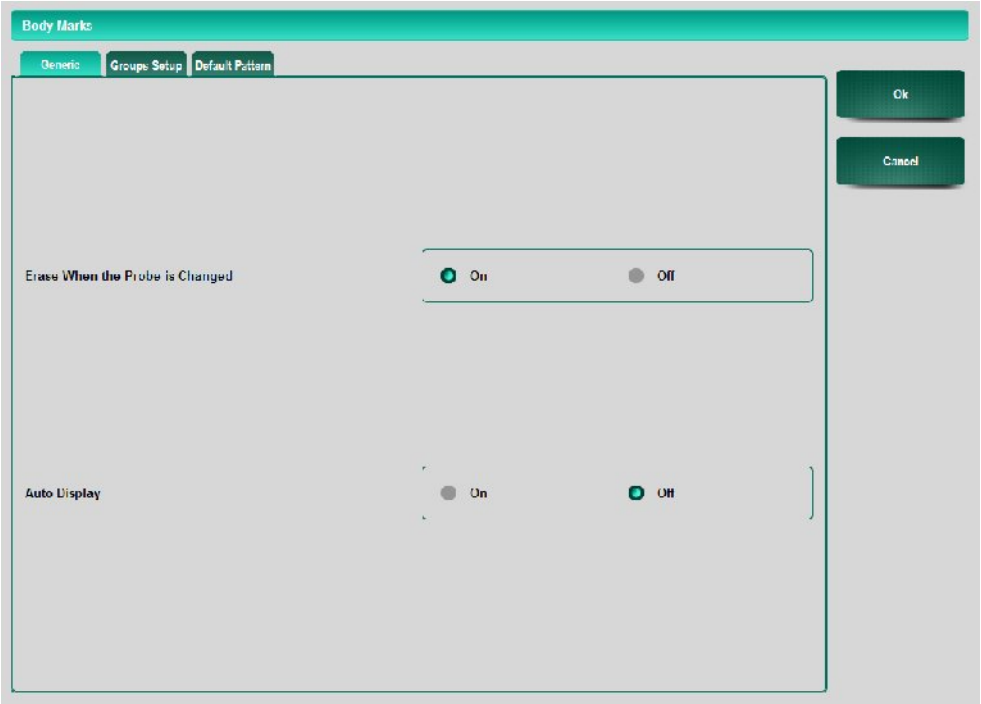
**CAUTION**

**The INSTALL DEFAULT SETTINGS key will restore all settings to factory settings with loss of all user modifications.**

## Body Marks

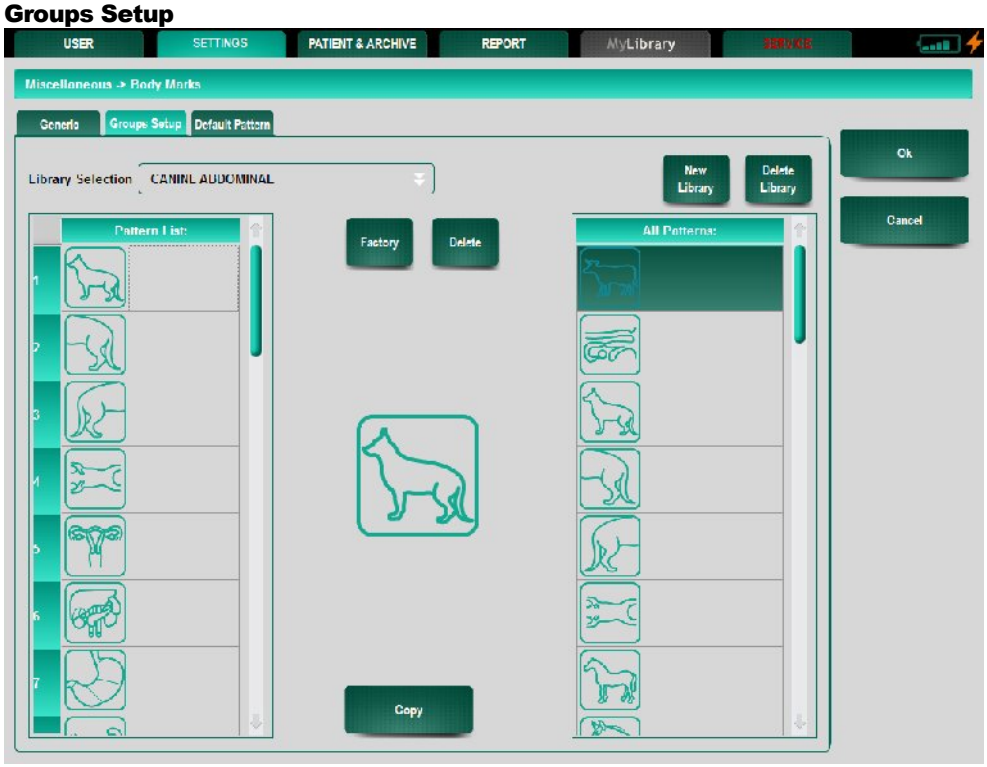
The section for the body marks consists of three tabs: **GENERIC**, **GROUP SETUP** and **DEFAULT PATTERN**.

**Generic**




| Parameter | Description |
|---|---|
| **Erase when the Probe is Changed** | When this setting is active, changing the active probe removes the body mark from the screen. |
| **Auto Display** | If this setting is enabled, the default body mark is displayed on the screen as soon as the image is frozen. |

### Groups Setup



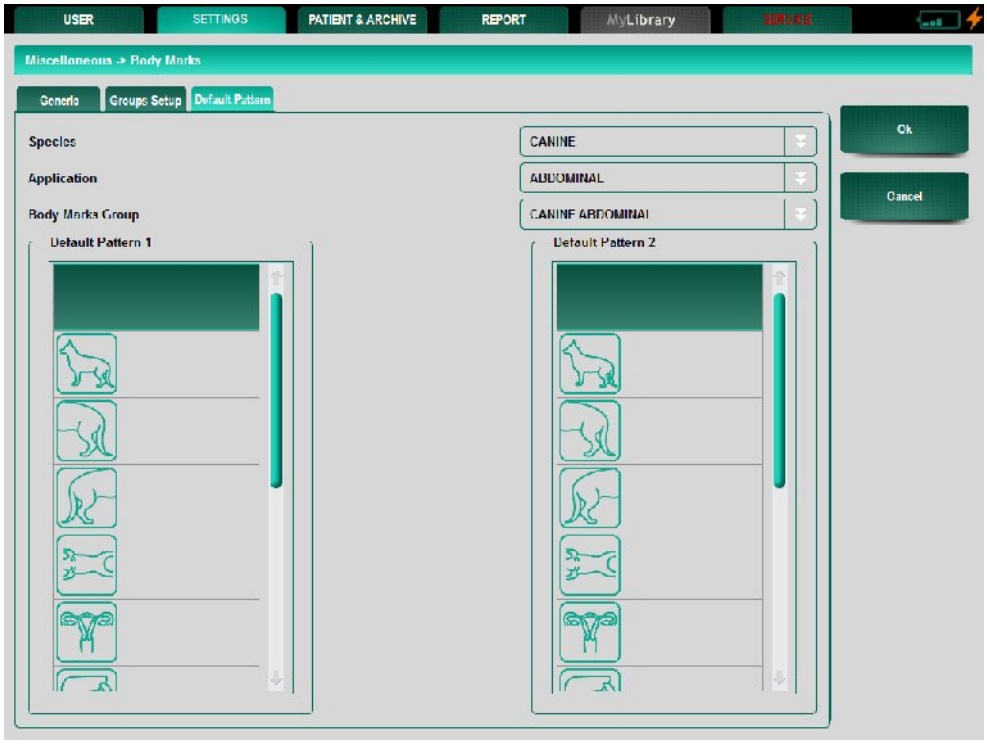

| Parameter | Description |
|---|---|
| **Library Selection** | Selects the body marks library. |
| **New Library** | Adds a new body marks group.<br>In order to create a new group, edit the name in the editable field (Library Selection) and press New Library. The Pattern List on the left will be empty. It is possible now to select a pattern from the All Patterns list on the right of the screen and copy it into the Pattern List (of the new group). |
| **Delete Library** | Deletes the group selected via the pull-down menu. |
| **Patterns List** | Lists the body marks belonging to the selected group. |
| **All Patterns** | List all the body marks from all the groups in the system. |
| **Factory** | Restores the factory body marks groups. |
| **Delete** | Removes a body mark from the list. |
| **Copy** | Allows to copy a body mark from the All Patterns list on the right of the screen into the Pattern List. |

A body mark can be added inside the Pattern List by selecting a cell and then pressing **COPY**.

Selecting a body mark in the Pattern List and pressing **DELETE** removes the body mark from the group.

Selecting **OK** confirms the modifications.

**Default Pattern**




| Parameter | Description |
|---|---|
| **Application** | Selects the application. |
| **Body Marks Group** | Sets the group to associate to the application. |
| **Default pattern 1/2** | Sets the default body mark for the application. |

# Annotation Setup

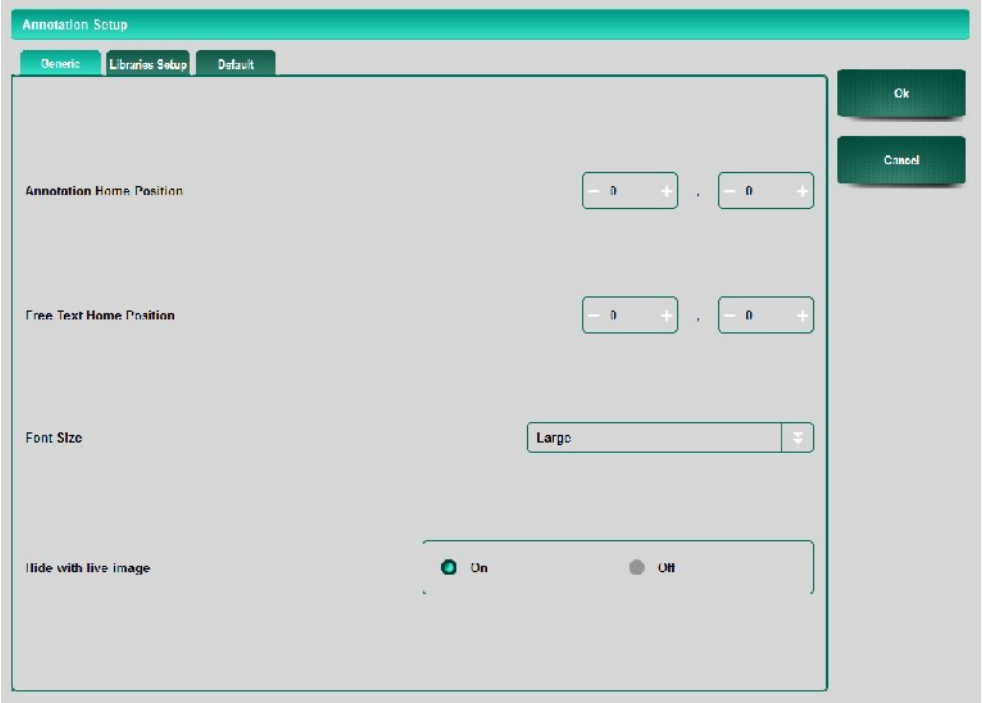
The glossary is composed of several user configurable libraries. It is possible to assign a specific library to each application.

This menu is organized in three tabs: **GENERIC**, **LIBRARIES SETUP** and **DEFAULT**.

**Generic**

This folder allows choosing the font size. It is also possible to modify the home position of the annotation text as well as the free text.

To automatically delete the text when returning to Real Time, select the option Hide with live image 'On'.



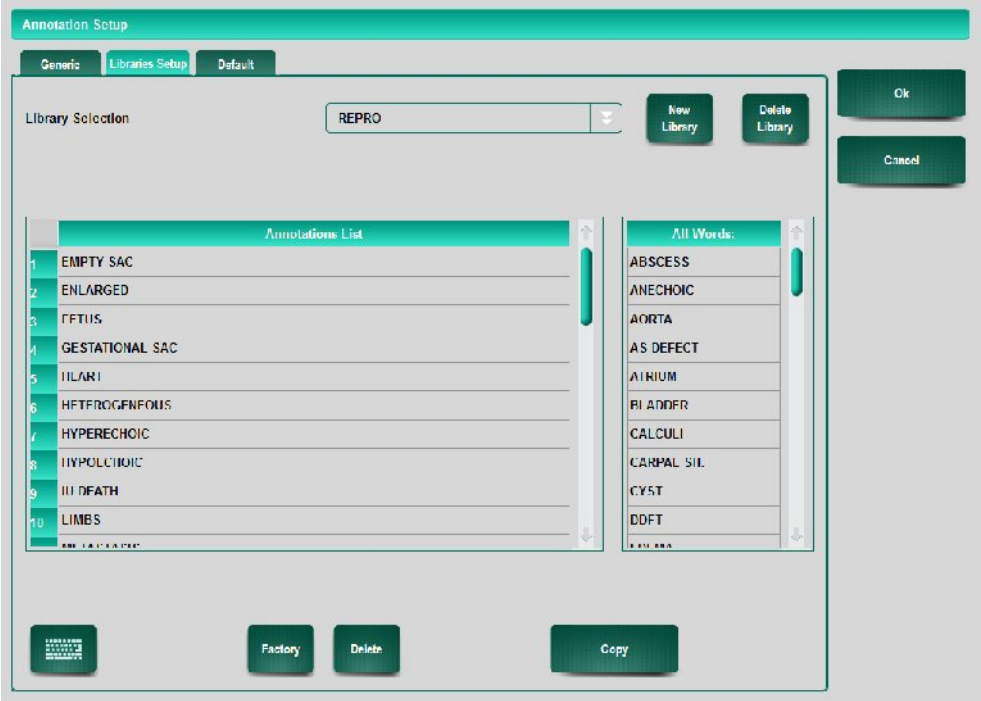

| Parameter | Description |
|---|---|
| **Annotation Home Position** | Sets the coordinates for the text annotation home position. |
| **Text home position** | Sets the coordinates for the home position for free text editing. |
| **Font size** | Sets the size of the text. |
| **Hide with Live Image** | When enabled, removes the annotations from the screen when the system is unfrozen. |

### Libraries Setup

The user can assign both a list of single words and a list of sentences to a library.

#### Library by Word

The configuration menu looks like the following figure




| Parameter | Description |
|---|---|
| **Library Selection** | Selects the annotation library. |
| **New Library** | Adds a new library to the list.<br>In order to create a new library, edit the name of the library in the editable field (Library Selection) and press New Library. The Annotation List on the left will be empty. It is possible now to select a word from the All Words list on the right of the screen and Copy it into the Annotations List (of the new library) |
| **Delete Library** | Deletes the selected library. |
| **Annotation List** | Lists the words enclosed in the library selected in the Library Selection List. |
| **All words** | Lists all the words from all the libraries. |
| **Factory** | Restores the factory libraries. |
| **Delete** | Removes a word from the list. |
| **Copy** | Allows to copy a word from the All Words list on the right of the screen into the Annotations List. |

*Refer to the "Software Keys" section for further details on the glossary*

The Library Setup can be activated in the annotation mode By Word or By Sentence.

The annotation list in the mid part of the menu consists of a list of words to be assigned. On the right, there is a list of all the words available, inserted in the different libraries.

To insert a new word or change a word in the Annotations list, press on a word to highlight and the press the keyboard icon. **MyLab** will allow entering text through the alphanumeric keyboard. A blank box can be used as a space inside the list.

*Press on the desired item to highlight*

Words available from the list on the right can be added to libraries. Highlight the desired item and press **COPY** to insert the word into the list. To delete a word, select a word until it is highlighted and press the **DELETE** key.

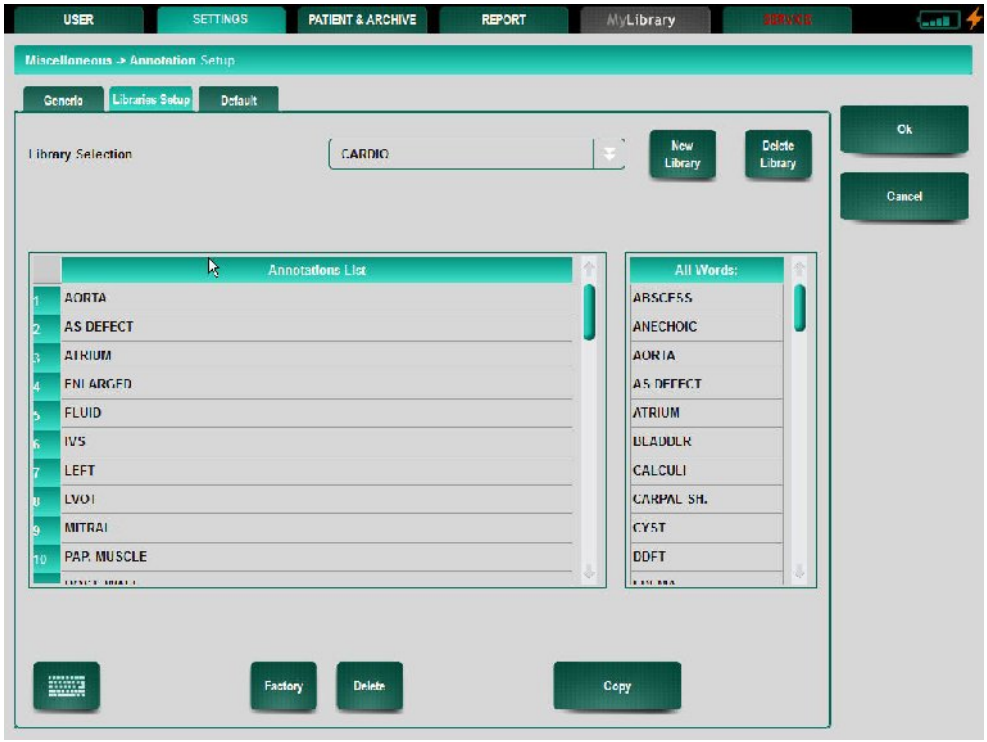
*New library definition*

To create a new library, press the desired field and enter the name of the library with the alphanumeric keyboard. Press **NEW LIBRARY** to create new words following the previous instructions. **DELETE LIBRARY** key deletes the selected library.

In each menu, the **FACTORY** key allows assignment of factory settings.

### Library by Sentences

The configuration menu looks like the figure below:



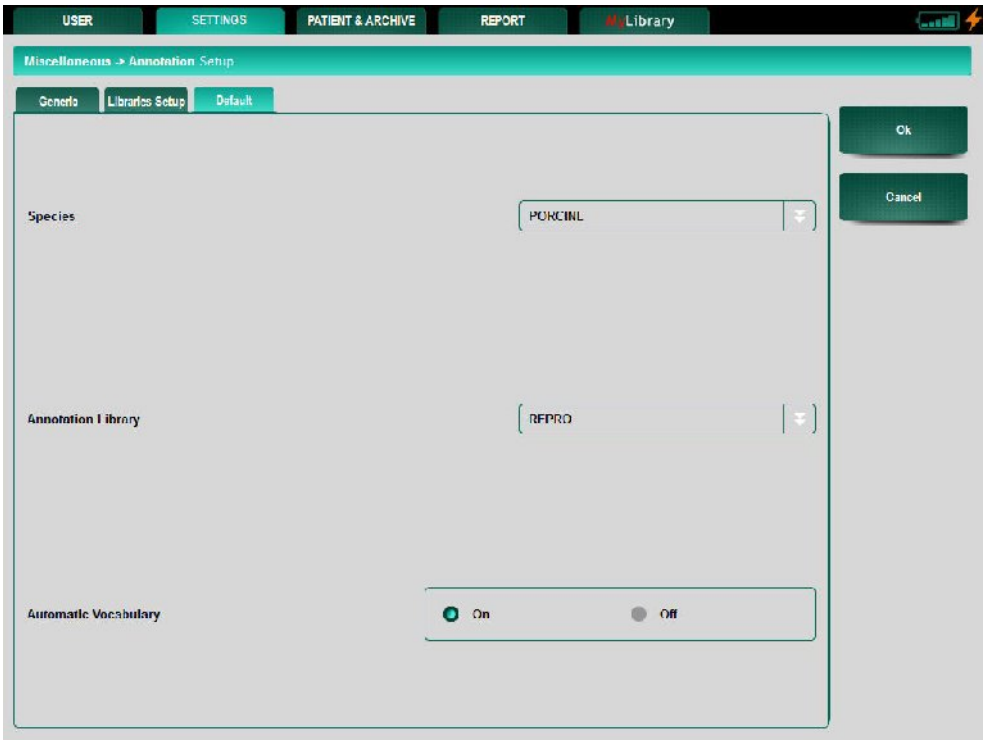

*Refer to the "Software Keys" section for further details on glossary*

The menu shows an active library with a table composed of four columns. Every row of the table is a sentence, composed of the four words listed in the four columns. At the right of the table the system displays the list of the words present in all libraries.

The procedure to create and modify a library is the same of the glossary by word previously described.

### Default

The configuration menu looks like the figure below:




| Parameter | Description |
|---|---|
| **Species** | Selects the specie. |
| **Annotation Library** | Selects the library that is associated with the application. |
| **Automatic vocabulary** | Enables the matching word suggestion system during the free text editing. |

**MyLab** allows assignment of a preferred library to each application. The pull-down menu shows the available libraries. To make a selection just press the desired library. Both libraries by word and by sentences can be assigned to each application.

*The **ANNOT** key will automatically activate text insertion during the exam*

When **Automatic Vocabulary** is selected, **MyLab** automatically activates, during the annotation phase, the search of words through the application library. If the characters entered occur in the active library, the system will automatically propose that word. To confirm the proposed word, press **ENTER** or proceed with text insertion.

**Note**

The automatic Vocabulary option works with an external keyboard only.

Chapter 9

# 9 - Export Settings

This chapter explains which formats can be set to export the exams.

## Images and Clips Formats

The option allows to set the compression format of single images and clips and the export format of reports. The defined formats will be used each time images, clips, and reports are exported.

**Clips Formats**
The following formats are available:

- Codec MS-PEG4 V2, ensuring the best image quality.
- Codec MS-VIDEO1, ensuring a higher compatibility with other software programs for clips management.

**Image Formats**
The following formats are available:

- No compression (BMP format), ensuring the best image quality.
- Medium compression (PNG format), ensuring a good image quality.
- Compressed (JPEG format), with low image quality.

**Report**
The report can be exported in:

- XML format.
- Editable PDF file format.

Chapter 10

# 10 - Peripheral Controls

This chapter explains the controls on the exterior of the **MyLab** and peripheral devices.

## MyLab Handle-Keys

The system is equipped with four programmable buttons on the battery handle.

The buttons can be programmed by holding down a button on the handle and press any imaging related key on the screen simultaneously. The programmed key will get an icon. In this icon the corresponding button of the handle is marked.

## Linear Probe

Several probes are equipped with three programmable buttons at the side. The probes can be configured to be used with image related buttons on the screen. It can be used e.g. to manage the **FREEZE** button or to control the real-time modes.

The buttons can be programmed with image related softkeys such as **FREEZE, FREQUENCY, GAIN,** all **SETTINGS** and more. Programming is performed by holding down a button on the probe and press any control panel key on the screen simultaneously. The programmed key is indicated with a mark that is linked to the corresponding button on the probe.


## Footswitch

**Footswitch**

A footswitch (available as an optional accessory) can be connected to **MyLab**. The footswitch can be configured to be used with image related buttons on the screen.

*GS*

It can be used e.g. to manage the **FREEZE** button or to control the real-time modes. The footswitch should be connected to connector **C16** (see Chapter 3 of the Getting Started) on the side panel of the Desk Stand (or Trolley).

The user can select which control keys shall be linked to the left and right footswitches. Controls on the user interface can be associated to the keys of the footswitch.

The buttons can be programmed by holding down one of the footswitches and press any control key on the screen simultaneously. The programmed key is indicated with a mark that is linked to the corresponding footswitch.

# MYLIBRARY SECTION

This section encloses information about the MyLibrary interface. The section is organized as follows:

- Chapter 1: MyLibrary

  This chapter describes the concept of the MyLibrary and important warnings regarding the use of MyLibrary.

# Table of Contents

Chapter 1

# 1 - MyLibrary

The MyLab product incorporates the concept of the MyLibrary. This MyLibrary function gives an 'on-board' viewing possibility showing veterinary procedures according to a reference doctor. The information is set up following a commonly used approach meaning: an image of the relevant anatomical structure, a picture showing the suggested probe positioning on the specific anatomical site, the clinical ultrasound image normally resulting from the scan in the specific anatomical site and some explanatory text. Not all components have to be available in the MyLibrary. MyLibrary is intended to be used for training, review or reminding. All presented information inside MyLibrary is made under the full authority of the reference doctor who is mentioned in the credits page. A basic level of ultrasound scanning is needed before using the information given in MyLibrary.

MyLibrary is a software environment with a limited numbers of image examples that may help the user to perform the examination because, if used properly, it may help the user to recall the correct interpretation of the images and recognize the main anatomical structures. MyLibrary must be used in accordance with the following warnings in order to avoid possible harm to the patient due to the wrong interpretation of the images or inappropriate use of the ultrasound equipment or the inappropriate performance of the procedure.

**WARNINGS**

Observe the following warnings for maximum safety

**Warnings**

- Only a limited numbers of cases/images are represented as examples without considering all possible anatomical variance or pathological findings between different individuals.
- The procedures showed are based on the ultrasound procedures as defined by the MyLibrary reference specialist and local procedures can be different from this one. The MyLibrary reference specialist is indicated in the credit window of the MyLibrary.
- Misinterpretation of the MyLibrary images can give a risk for wrong probe anatomical location.
- Esaote underline the importance for the user to reach through adequate training courses proper skills in the use of ultrasound equipments, ultrasound image interpretation and procedures.
- A basic level of medical ultrasound scanning, ultrasound image interpretation and a basic level of ultrasound probe manipulation are needed to perform ultrasound guided procedures.

- MyLibrary cannot substitute the proper training of the user in the management of the ultrasound equipment, in the interpretation of the ultrasound images and in the performance of procedures.
- MyLibrary is a reference tool providing information and suggestions, not aimed to over-rule or modify in any case the local standard operating procedure. Esaote is not responsible for the results and/or consequences of any performed procedure.
- It is very important to select the proper anatomical site to make sure the right example images are shown.

It is recommended to the user to consider this warning appropriately in order to correctly interpret the ultrasound images and perform the examination and the procedures considering the specific conditions of the single patient under examination.

This chapter explains how to use the MyLibrary function.

## MyLibrary activation

MyLibrary is an on-board reference tool integrated in the system that provides application aid and tips in the use of the system during procedures.

To activate MyLibrary, press the **MYLIBRARY** tab from the section tabs. The acceptance page will be displayed as shown below.

The acceptance page emphasizes to the user the importance of using MyLibrary in accordance with the instruction of this User Manual and MyLibrary's inherent limitations and provides to the user the following information:

MYLIBRARY IS A SOFTWARE ENVIRONMENT WITH A LIMITED NUMBERS OF IMAGE EXAMPLES THAT MAY HELP THE USER TO PERFORM THE EXAMINATION BECAUSE, IF USED PROPERLY, IT MAY HELP THE USER TO RECALL THE CORRECT INTERPRETATION OF THE IMAGES AND RECOGNIZE THE MAIN ANATOMICAL STRUCTURES. MYLIBRARY MUST BE USED IN ACCORDANCE WITH THE FOLLOWING WARNINGS IN ORDER TO AVOID POSSIBLE HARM TO THE PATIENT DUE TO THE WRONG INTERPRETATION OF THE IMAGES OR INAPPROPRIATE USE OF THE ULTRASOUND EQUIPMENT OR THE INAPPROPRIATE PERFORMANCE OF THE PROCEDURE.

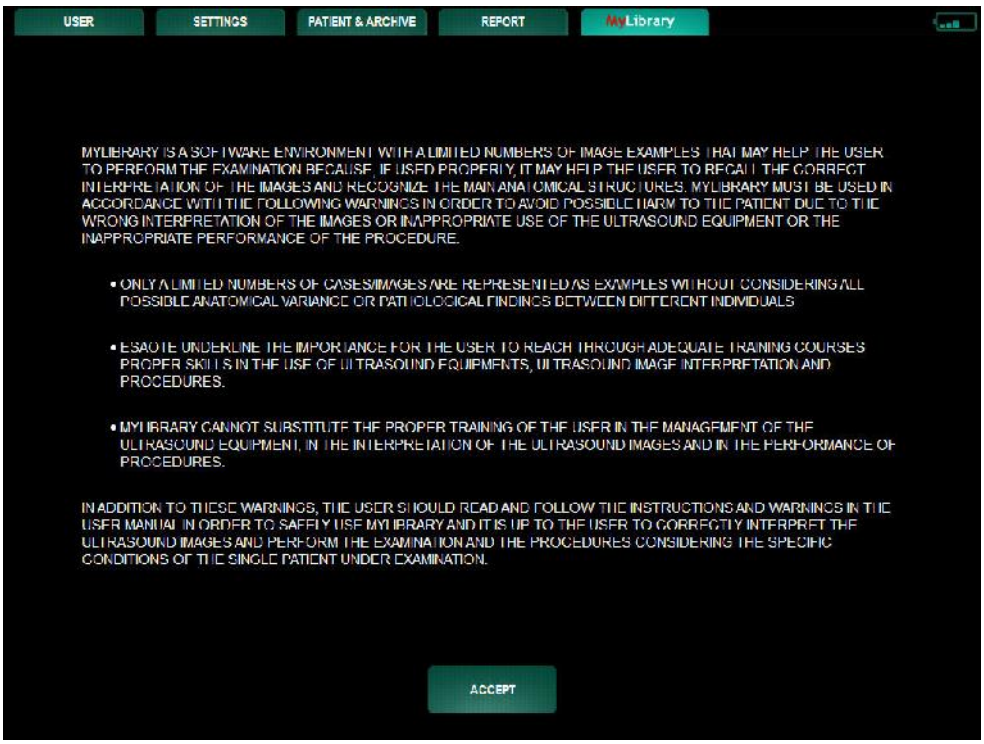
- ONLY A LIMITED NUMBERS OF CASES/IMAGES ARE REPRESENTED AS EXAMPLES WITHOUT CONSIDERING ALL POSSIBLE ANATOMICAL VARIANCE OR PATHOLOGICAL FINDINGS BETWEEN DIFFERENT INDIVIDUALS

- ESAOTE UNDERLINE THE IMPORTANCE FOR THE USER TO REACH THROUGH ADEQUATE TRAINING COURSES PROPER SKILLS IN THE USE OF ULTRASOUND EQUIPMENTS, ULTRASOUND IMAGE INTERPRETATION AND PROCEDURES.
- MYLIBRARY CANNOT SUBSTITUTE THE PROPER TRAINING OF THE USER IN THE MANAGEMENT OF THE ULTRASOUND EQUIPMENT, IN THE INTERPRETATION OF THE ULTRASOUND IMAGES AND IN THE PERFORMANCE OF PROCEDURES.

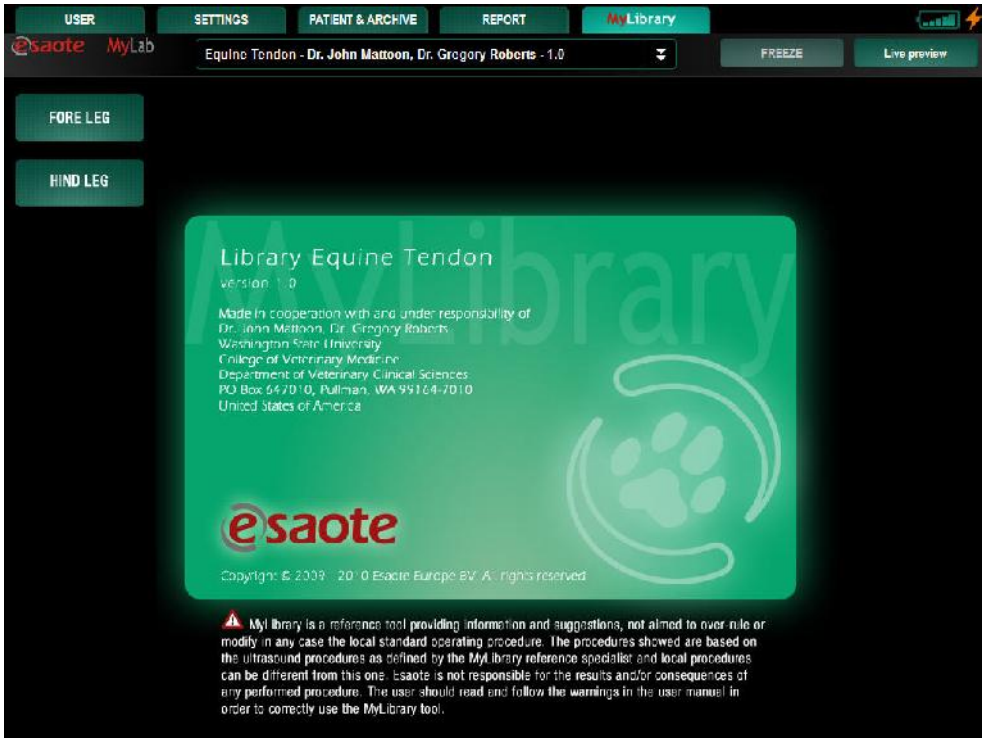
IN ADDITION TO THESE WARNINGS, THE USER SHOULD READ AND FOLLOW THE INSTRUCTIONS AND WARNINGS IN THE USER MANUAL IN ORDER TO SAFELY USE MYLIBRARY AND IT IS UP TO THE USER TO CORRECTLY INTERPRET THE ULTRASOUND IMAGES AND PERFORM THE EXAMINATION AND THE PROCEDURES CONSIDERING THE SPECIFIC CONDITIONS OF THE SINGLE PATIENT UNDER EXAMINATION.

To proceed further and activate MyLibrary the user has to press the **ACCEPT** tab shown in the lower part of the acceptance page. The user should press this tab only if he/she has reached the proper level of understandings through reading this User Manual about MyLibrary tool functions and limitations and he/she is able to correctly interpret the information provided in MyLibrary.

**ACCEPTANCE SCREEN**




To activate MyLibrary press **ACCEPT** and the following screen will be displayed.




On the left side of the screen a list of the anatomical sites is displayed.

**Note**

The MyLibrary tab can be enabled in the system setup menu. Refer to chapter 2 of the system configuration manual.

## MyLibrary Organization

MyLibrary consists of a database with sample images and (sub) application information.
On the left side of the screen, there is a list of anatomical sites, which the user can select. Selecting an anatomical site opens a sub-list of applications that can be selected and displayed in the rest of the page.
The page describing the selected application can include:

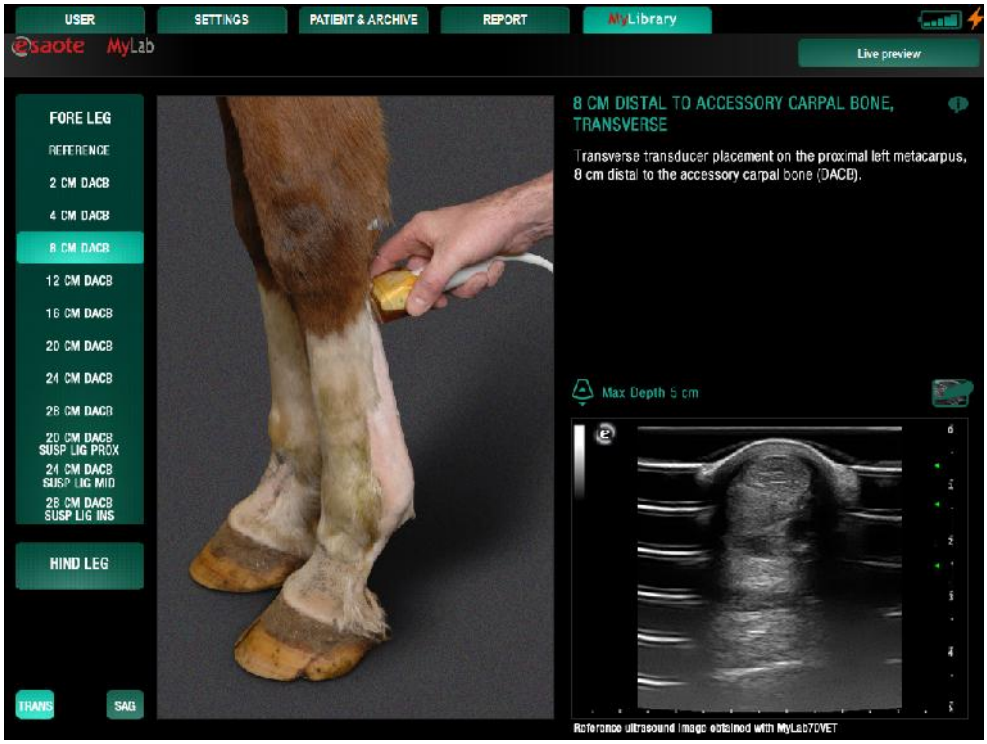
- An image of the anatomical structure.
- A picture with an example of scanning in the specific application, showing the suggested probe positioning on the specific anatomical site.
- The clinical ultrasound image example resulting from the scan in the specific anatomical site.

**WARNINGS**

Observe the following warnings for maximum safety

### Warnings

- Only a limited numbers of cases/images are represented as examples without considering all possible anatomical variance or pathological findings between different individuals.
- The procedures showed are based on the ultrasound procedures as defined by the MyLibrary reference specialist and local procedures can be different from this one. The MyLibrary reference specialist is indicated in the credit window of the MyLibrary.
- Misinterpretation of the MyLibrary images can give a risk for wrong probe anatomical location.
- Esaote underline the importance for the user to reach through adequate training courses proper skills in the use of ultrasound equipments, ultrasound image interpretation and procedures.
- A basic level of medical ultrasound scanning, ultrasound image interpretation and a basic level of ultrasound probe. manipulation are needed to perform ultrasound guided.procedures.
- MyLibrary cannot substitute the proper training of the user in the management of the ultrasound equipment, in the interpretation of the ultrasound images and in the performance of procedures.
- MyLibrary is an educational tool providing information and suggestions, not aimed to over-rule or modify in any case the local standard operating procedure. Esaote is not responsible for the results and/or consequences of any performed procedure.
- It is very important to select the proper anatomical site to make sure the right example images are shown.



*Overlay icon*

Pressing the overlay icon on the right side of the screen will activate an overlay on the ultrasound image describing the relevant anatomical structures.
The same anatomical structures are also described in the legenda above the ultrasound image.

The buttons **TRANS** and **SAG** (positioned on the left bottom part of MyLibrary environment) select the page of MyLibrary to display (transversal or sagittal, if applicable for the selected section).

### Live Preview[1]

The **LIVE PREVIEW** key activates the Real Time image from the scanner in the top right part of MyLibrary environment. The user can compare this way the Real Time image scan with the example ultrasound image in the Library Database. The **FREEZE** key freezes the Real Time image in the live preview window.

**WARNINGS**

Observe the following warnings for maximum safety

**Warnings**

- The Live Preview function allows visualizing the real time image inside MyLibrary to compare it with the available image examples. This viewing environment is absolutely not suited to perform any interpretation of the ultrasound images and not suited for the performance of Anaesthesiology and Musculoskeletal procedures.
- In Live Preview there is no possibility to change settings to optimize the ultrasound image. If a change of settings is needed it is mandatory to switch to the user or settings pages

### Credits

*Credits icon*

The Credits Icon is placed on the top right part of the MyLibrary environment and is linked to the Credit Window. Pressing the icon will open the Credit Window showing the MyLibrary version and information about the development of the tool including medical references with whom MyLibrary is developed.

[1] Live Preview is not available for the USA market.


The Credit Window reports also the following warning:

MYLIBRARY IS A REFERENCE TOOL PROVIDING INFORMATION AND SUGGESTIONS, NOT AIMED TO OVER-RULE OR MODIFY IN ANY CASE THE LOCAL STANDARD OPERATING PROCEDURE. THE PROCEDURES SHOWED ARE BASED ON THE ULTRASOUND PROCEDURES AS DEFINED BY THE MYLIBRARY REFERENCE SPECIALIST AND LOCAL PROCEDURES CAN BE DIFFERENT FROM THIS ONE. ESAOTE IS NOT RESPONSIBLE FOR THE RESULTS AND/OR CONSEQUENCES OF ANY PERFORMED PROCEDURE. THE USER SHOULD READ AND FOLLOW THE WARNINGS IN THE USER MANUAL IN ORDER TO CORRECTLY USE THE MYLIBRARY TOOL.

# SPECIALTY PROBES AND NEEDLE GUIDE SECTION

*Refer to Getting Started manual for available probes.*

This section provides information on how to interact with the Needle Guide.

The section is organized as follows:

- Chapter 1: General Information on Needle Guides

  This chapter gives a list of the needle guide kits that can be used and provides general information about the correct way to use the Needle Guide Software.

- Chapter 2: Using the Needle Guide

  This chapter explains how to verify the needle guide working and to use it.

**Read the "Transducers and Consumables" Manual carefully for detailed information on how to properly and safely handle the probes and their Needle Guide Adaptors.**

# Table of Contents

Chapter 1

# 1 - General Information on Needle Guides

For **MyLab** there are a series of optional adaptors for the biopsy needle guide available. These are equipped with specific couplings that attach to the probe. **MyLab** can be used to display a needle guideline[1] throughout the ultrasound image. This chapter gives general information about the correct way to use the needle guides.

The entire needle guide program is managed through the **BIOPSY** key. The biopsy procedure is active in B-Mode, in CFM and if the active probe is compatible with an attachment kit.

TC **The user should read and completely understand all information on probes and biopsy kits, as detailed in the "Transducers and Consumables" manual, prior to use of this software**.

## Needle Guide Kits

The table below lists the available adaptors:

| Biopsy adaptor | Probe |
|---|---|
| WBSL33X | SL3332 |
| CBSL33X | SL3332 |
| IKL3323 | SL3323 |
| IKC3421 | SC3421 |
| CBSC23X | SC3123 |

**Note**

All the listed kits can be used only in biopsy needle guide procedures.

TC **Refer to the "Transducers and Consumables" manual for the needle guides to be used with Esaote probes. Needle guide kits which are not tested by**

[1] The IKL3323 and IKC3421 are Needle guides with infinite angle capabilities, no needle guideline is available throughout the ultrasound image for these Needle Guides.

**WARNING**

**Esaote could be non compatible with the Esaote probes and thereby could compromise the patient's safety.**

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Chapter 2

# 2 - Using the Needle Guide

*Refer to Getting Started manual for available probes*

This chapter explains how to verify that the needle guide is correctly working and how to use it with **MyLab**.

## Needle Guide Selection

After pressing the **BIOPSY** key, the **BIOPSY** menu will appear. In this menu the biopsy kit and biopsy angle can be selected. After selecting OK the screen will display two dotted lines circumscribing the working region of the needle guide. The needle insertion angle can be fixed or variable, according to the probe and guide being used.

According to the probe and guide being used, select when necessary, the guide and then the needle insertion angle.

| Probe | Insertion angle |
|---|---|
| SL3332 | 35°, 25°*, 40°*, 50°* |
| SL3323[1] | 42°÷81°* |
| SC3421[2] | 42°÷57°* |
| SC3123 | 20°÷35°* |

* Available only with disposable kit

## Checking the Guide's Working

- Assemble the needle guide on the probe, following the instructions provided by the manufacturer or the "Transducers and Consumables" manual.

**TC** **Carefully read the "Transducers and Consumables" manual: all features relating to system safety, warnings and cautions also apply to needle guides.**

[1] [2] The IKL3323 and IKC3421 are Needle guides with infinite angle capabilities, no needle guideline is available throughout the ultrasound image for these Needle Guides.

- Immerse the probe to the allowed limit (see the "Transducers and Consumables" manual) in a water tank.
- Press the **BIOPSY** key and select the guide and the needle insertion angle, then select OK to continue.
- **MyLab** will display two dotted lines circumscribing the working region of the needle guide

**WARNING**

**Before proceeding, be sure the kit has been correctly assembled and the needle has been inserted into the guide corresponding to the angle selected during the calibration procedure. Needle insertion into a guide with a different angle may be dangerous to the patient's safety!**

- Both in B-Mode and Freeze, be sure that the needle is correctly displayed within the working area.
- If necessary, evaluate the needle length required by the biopsy procedure.

**WARNING**

**If the needle is displayed outside the working area, do NOT use the guide and immediately contact ESAOTE Service.**

## Using the Needle Guide

Biopsy procedures can be activated on 2D or 2D-CFM image formats.

**WARNING**

**Biopsy procedures must be performed only on real time image. Never move the needle when the image is frozen.**

**Procedure**

- Assemble the needle guide on the probe, following the instructions provided by the manufacturer or the "Transducers and Consumables" manual.


**Carefully read the "Transducers and Consumables" manual: all features relating to system safety, warnings and cautions also apply to needle guides.**

- Press the **BIOPSY** key and select the guide and the needle insertion angle, then select OK to continue.
- **MyLab** will display two dotted lines circumscribing the working region of the needle guide

**WARNING**

**The line displayed on the screen provides an indication of the needle direction, according to the selected guide. Always watch the ultrasound image while inserting the needle into the patient's body, and be sure that the needle always stays within the displayed area.**

**Note**

At certain scanning depths the needle insertion point or the needle itself could not be displayed.

**WARNING**

**When scanning vascularized structures, display the needle guide working area keeping the CFM mode active so that vessels can be detected and avoided when inserting the needle. Once identified the optimal zone for biopsy, turn CFM off to gain the maximum needle visibility.**

Once the needle guide line is displayed, the system temporarily disables all modes, except 2D or 2D-CFM image format. Select **BIOPSY** key to erase the needle guide line and to access other Real Time modes.

**After the Examination**

TC

When the biopsy procedure has been completed, remove the needle and the guide from the probe. Clean the items following the instructions provided in the "Transducers and Consumables" manual and by the manufacturer and, when applicable, dispose of the items according to the local regulations.