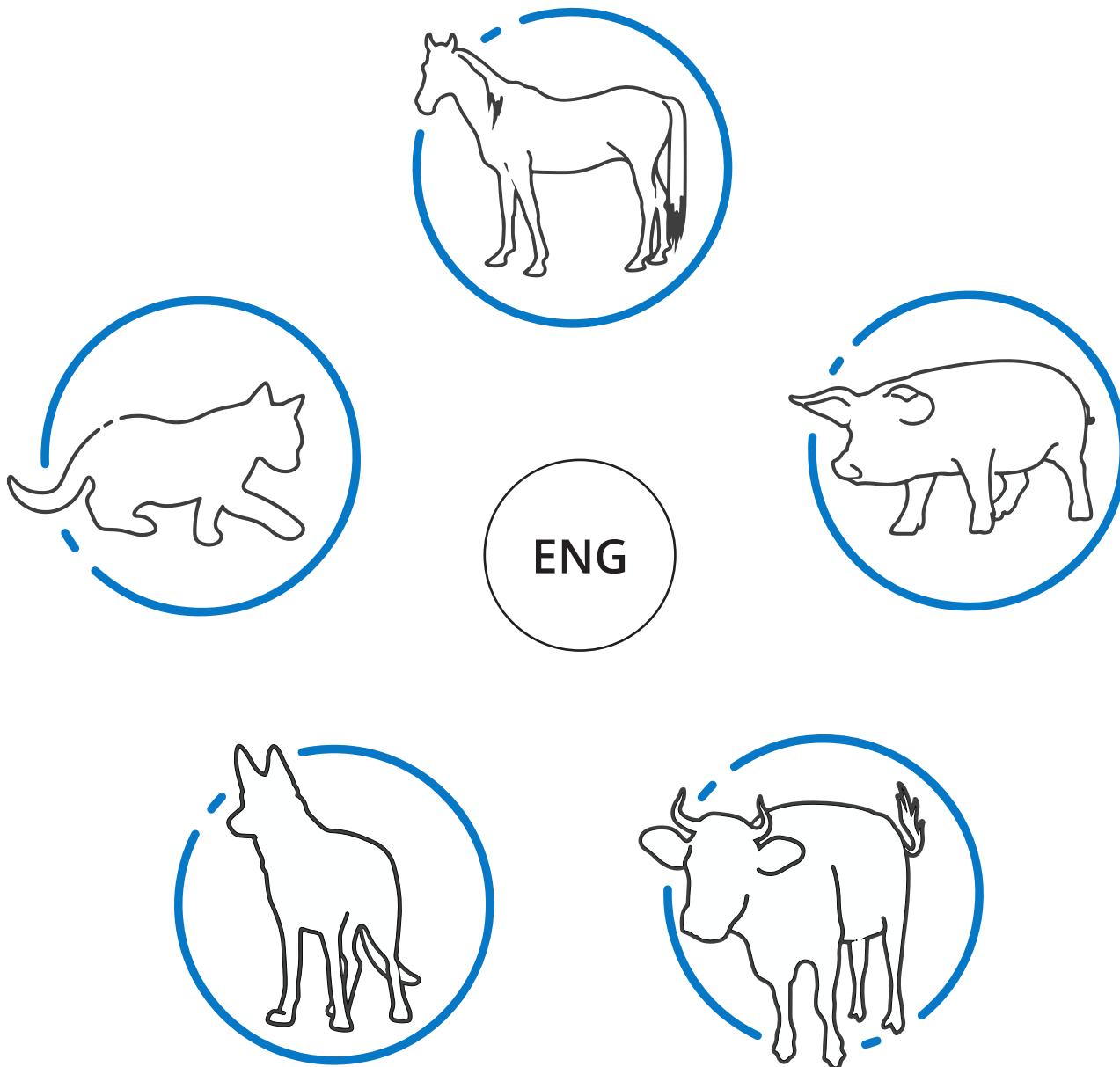


Portable Ultrasound Scanner

Users Manual



Safety Instruction



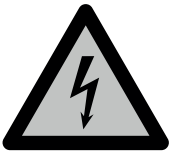
Warning!

No liability is accepted for damage caused by failure to observe these operating instructions. We accept no liability for consequential damage and damage to third parties!



Caution!

We accept no liability for damage to property or personal injury caused by improper handling or failure to observe the safety instructions. In such cases, all guarantee and warranty claims expire.



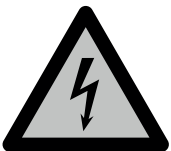
Warning!

Danger of suffocation and health by lithium-ion batteries! Children can swallow small parts, packaging or protective films. Keep children away from the product or its packaging! Keep batteries out of the reach of children. If your child has swallowed a battery, go to the doctor immediately!



Caution!

Never carry out repairs on the product yourself. Do not open the product. The product does not contain any parts to be serviced by the user. In the event of a defect, contact our customer service.



Warning!

Use only original power supplies and the appropriate power supply for the product.

Declaration of conformity

Herewith, the **Hartford Electronics GmbH, Rheinlanddamm 201a, 44139 Dortmund**, declares that this device complies with the basic requirements and other relevant requirements of the following EU directives:

Electromagnetic compatibility - 2014/30/EU

Low Voltage Directive - 2014/35/EU

RoHS directive - 2011/65/EU



The CE mark on the product confirms conformity. The declaration of conformity for this product is available on www.berghoch.de at Downloads.

This is a Class A product. In residential environments, this product can cause radio interference. In this case, it is the responsibility of the user to take appropriate measures to eliminate the fault.

Class A

**CAUTION:
DEVICE FOR VETERINARY USE ONLY!**

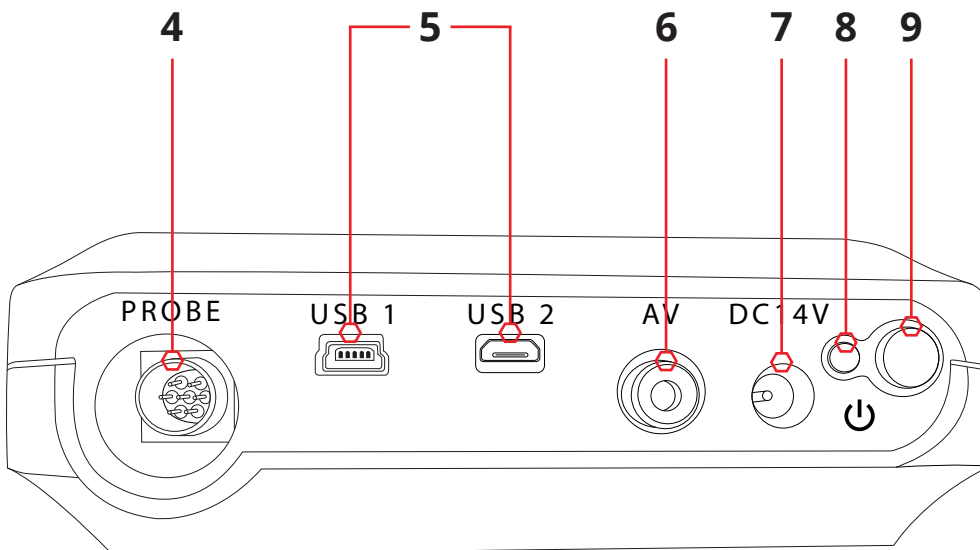
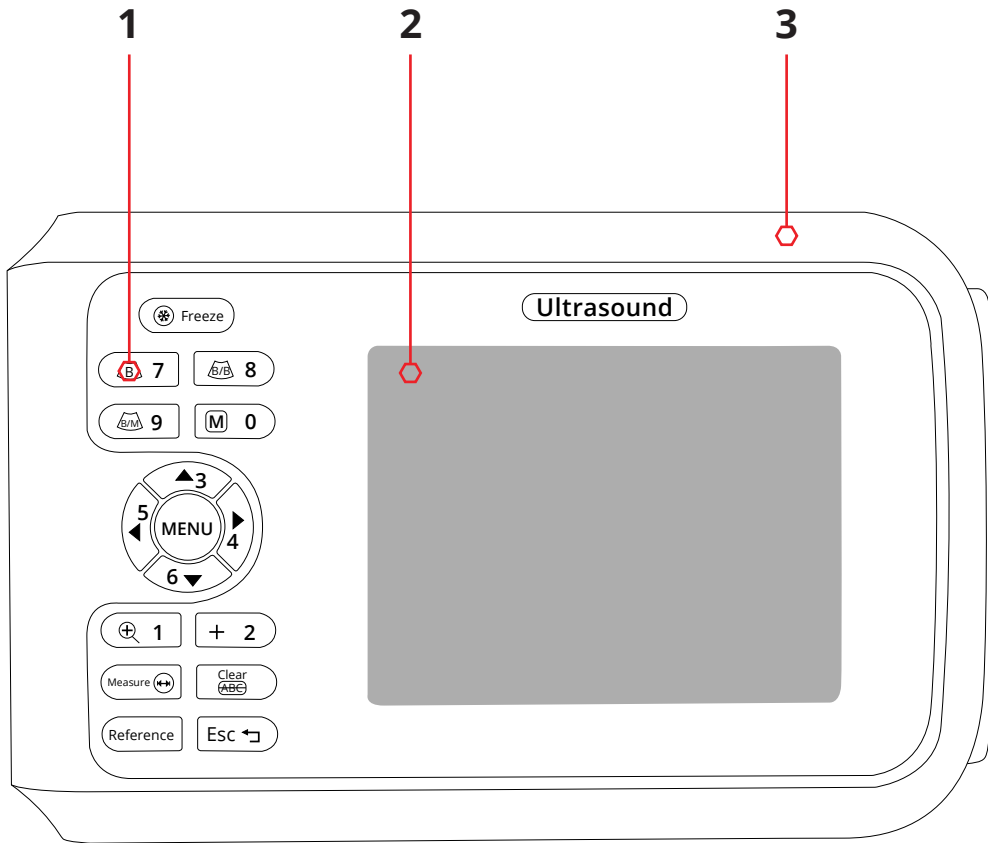
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1. System Basics

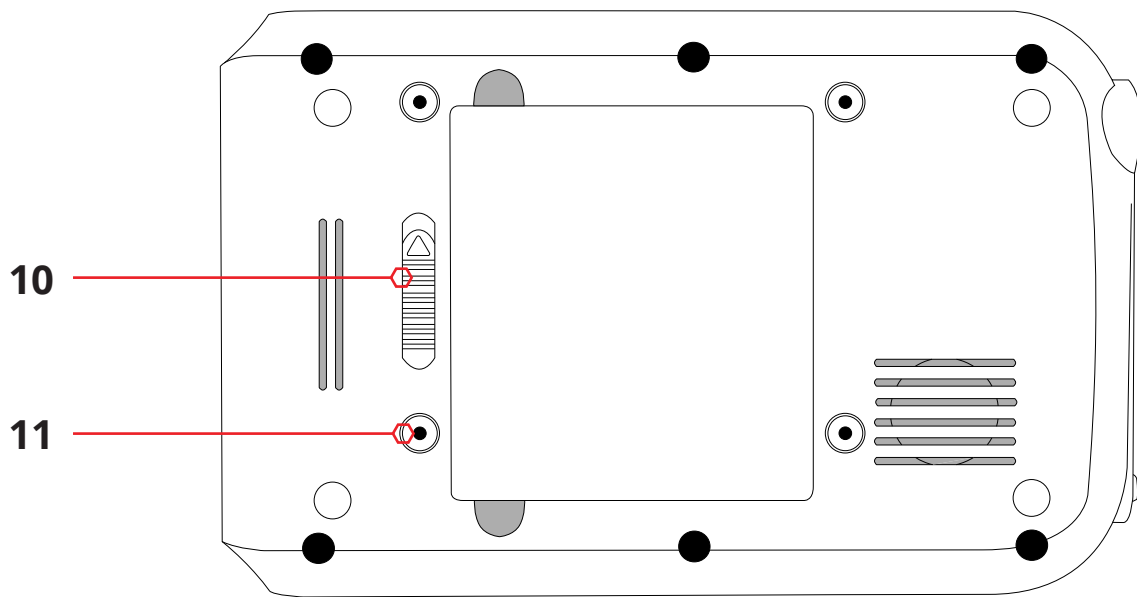
The ultrasound device is suitable for diagnosing horses, pigs, bovines, sheep, dogs, cats and other animals.

1.1 Structure




Right-Side of Scanner

System Basics



Back-Side of Scanner

| No. | Part | Description |
|-----|---|--|
| 1 | Keyboard | Program the scanner |
| 2 | TFT Color LCD | 5.5 inch (13,97 cm) screen |
| 3 | Rubber Protector | Around the scanner against dirt and impact from the outside |
| 4 | Probe | Probe connection |
| 5 | USB-1, USB-2 | The factory uses these USB ports for the main unit maintenance |
| 6 | AV port | Video output to see real time images in your TV or monitor |
| 7 | DC14V | Connection of AC-adaptor, input power supply is by DC14V |
| 8 | Power Indicator | It will be lighten when the machine is turn on |
| 9 |  | Power switch |
| 10 | Battery Lock | Lock/unlock the battery |

1.2 Main Features

- Light weight (850g) and portable, perfect for outdoor use and farms.
- Compact main unit with shoulder & wrist belts and rubber protector.
- Built-in memory to storage up to 128 images.
- Li-ion rechargeable battery can be removed easily.
- AV port to see real time images with your TV or monitor, this feature is Plug & Play.

2. System Connection

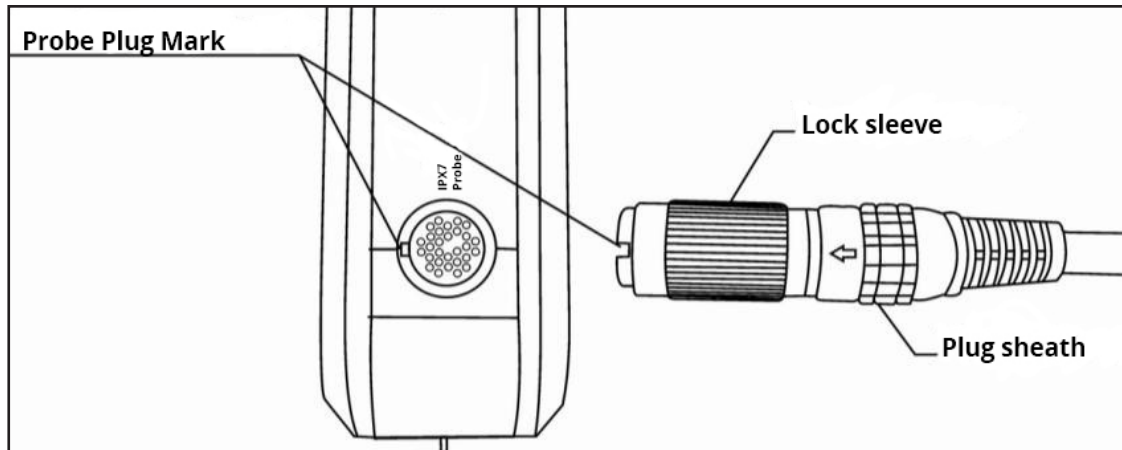
This chapter introduces how to operate & install system and the battery.

2.1 Installation & Disassembly

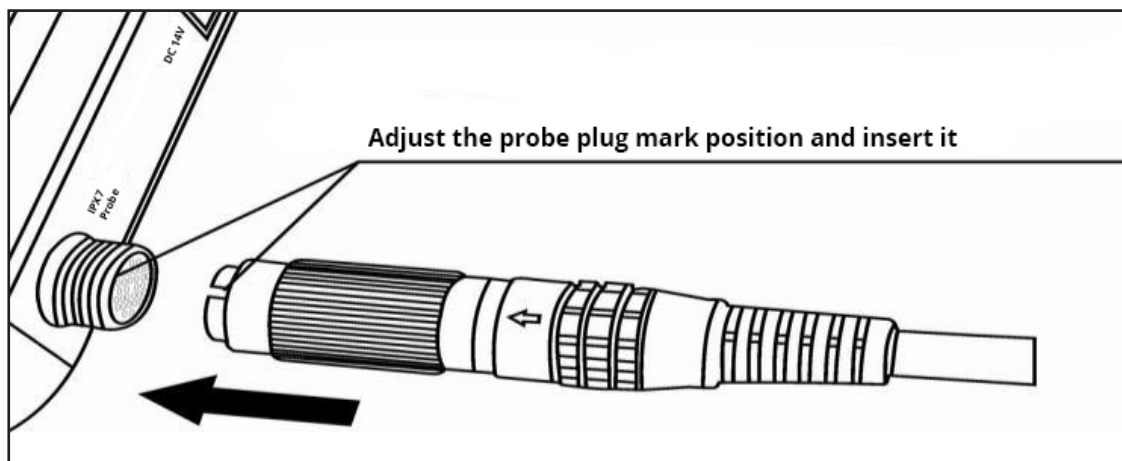
2.1.1 Probe Connection & Disconnection

The probe socket lies in the right side of the equipment. There is only one port for the probe.

Probe Connection:

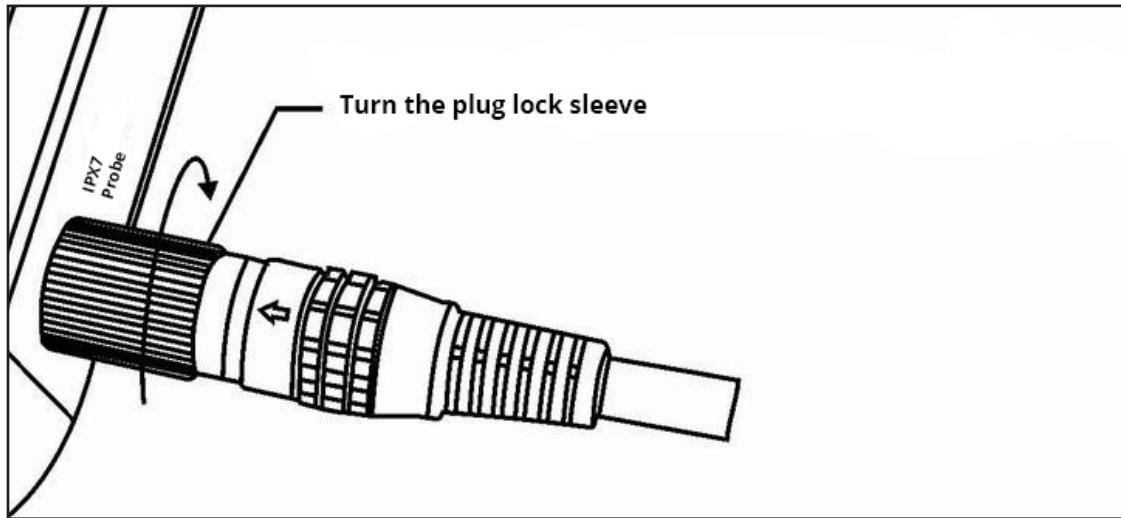


Step 1: Match the marks of both the probe socket and the plug.



Step 2: Put the plug into the socket along the marks.

System Connection



Step 3: Rotate the sleeve clockwise to lock the plug.

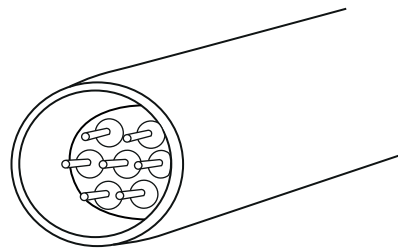
Probe Disconnection:

Step 1: Rotate the safe-sleeve anticlockwise to the bottom position.

Step 2: Take the sealed head and pull out the plug out of the socket.

Avoid by all means unplugging or plugging the probe when the main unit is turned on, it can cause permanent damage to the main unit and probe. Once the probe is connected to the main unit, do not unplug nor plug it unless the main unit is turned off.

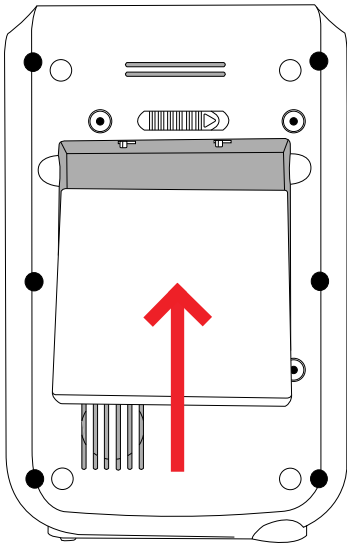
Do not touch the pins inside the probe connector.



System Connection

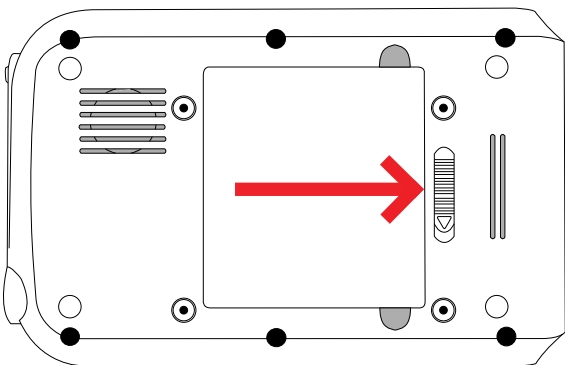
2.1.2 Battery Installation

Set the battery into the battery slot and move the battery release key on its back to top till the battery is inserted completely and then release the key.



1. Push the battery into the rabet like the arrowhead with little force.

Attention: Don't force it.



2. Lock the battery as shown in the photo. The battery is now installed perfectly (to unlock put the button to unlock position).

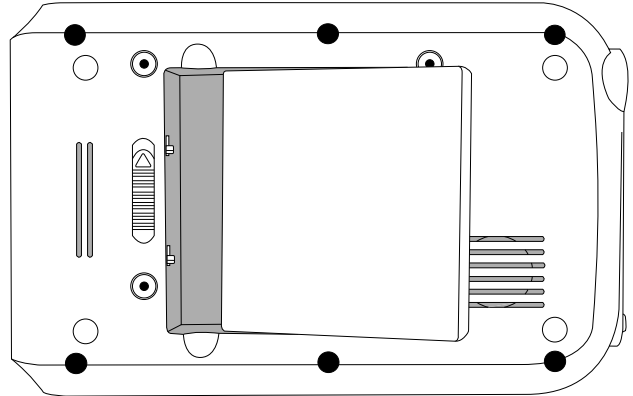


Charge time: 60 min

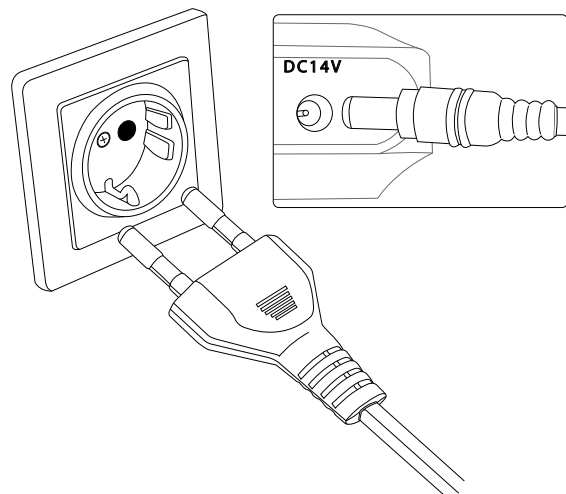
System Connection

2.2 Quick Guide

1. Insert battery.



2. Connect the power supply.

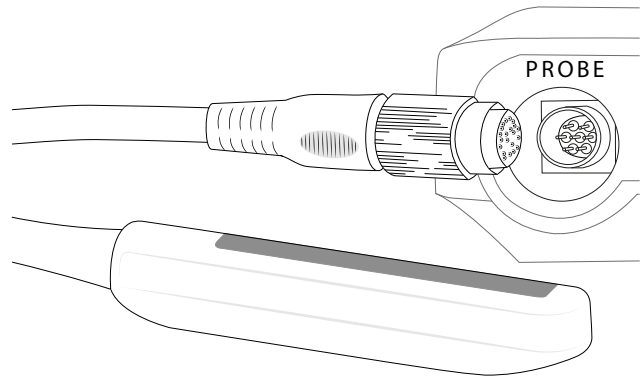


System Connection

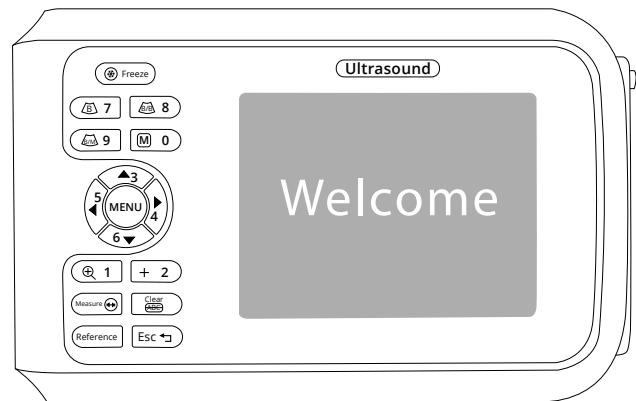
3. Install the probe.

Notes:

When diagnoses pauses, put the probe in its case and press [Freeze] key to keep it in a state of „Frozen“.

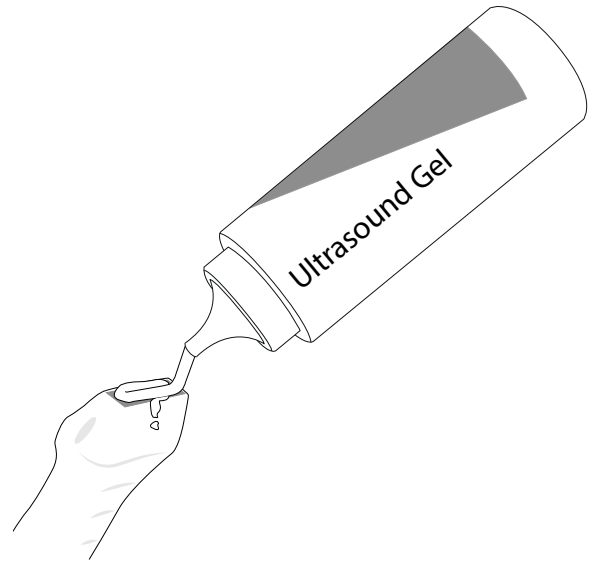


4. Turn on the device. There is the word "Welcome" showing on the screen. Press any key on the keyboard to have the system get into working-ready interface.

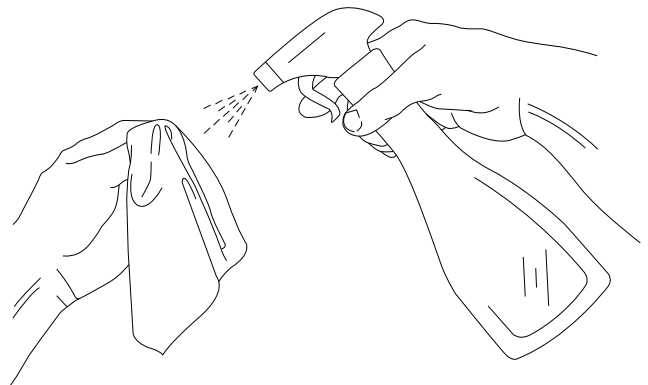


System Connection

5. Please use medical ultrasound gel during diagnosis.



6. After using the device, remove the gel from the probe and clean it with a paper soaked in disinfectant detergent solution.





WARNING: Using overheated transducers may burn patients.



CAUTION: If the system date and time are not the same as current ones, misdiagnosis may occur.

2.3 Shutdown

- 1 Put the probe on its holder.
- 2 Turn off peripherals connected to the scanner.
- 3 Turn off the scanner.
- 4 If the scanner will not be used for a period of time, remove power plugs from the scanner.
- 5 Clean and disinfect the probe(s) (see 10.4 probe maintenance and 10.5 cleaning for details)
- 6 Clean main unit and remove the battery.

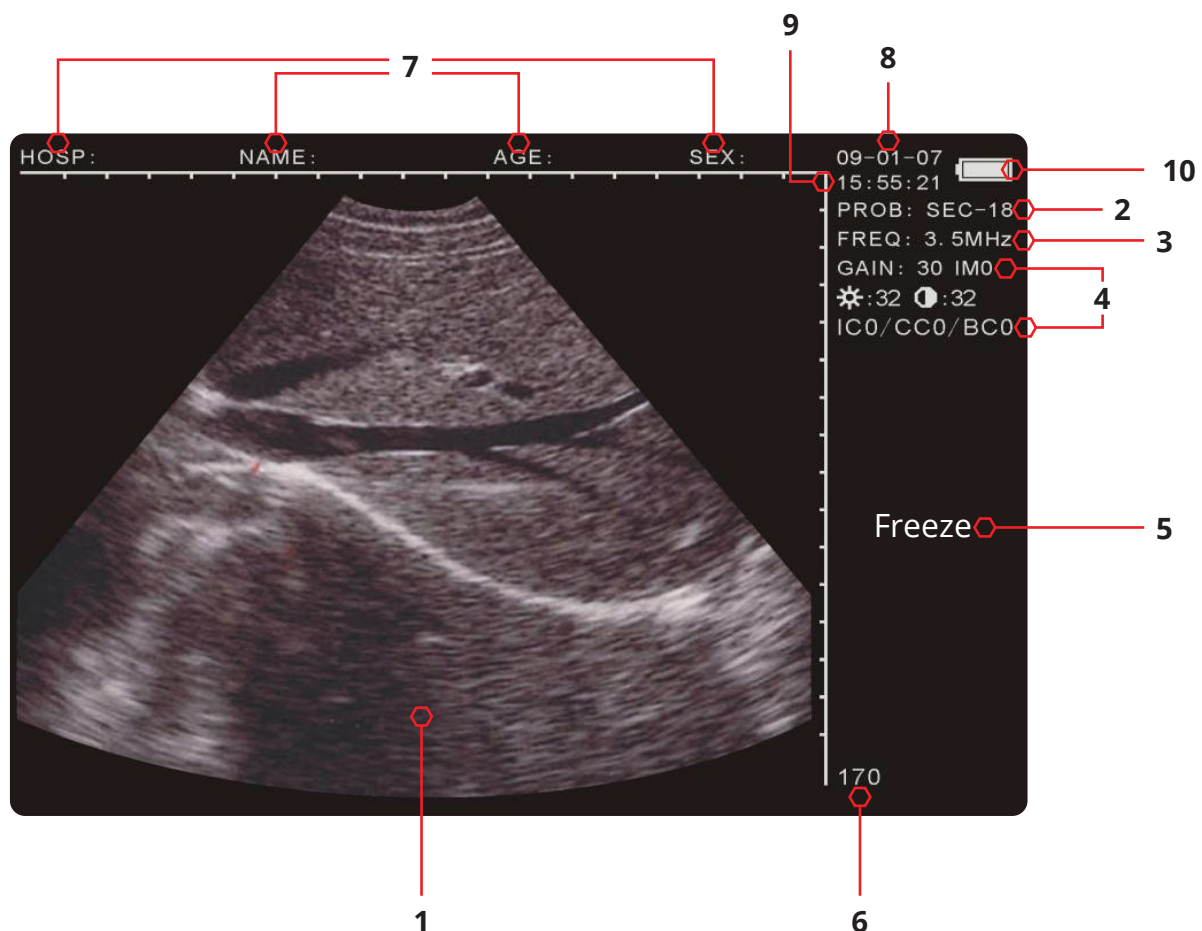
NOTE : The system can be turned on again at least 10 seconds after it is turned off.

3. Operating & Setting

This chapter describes how to use the keyboard function and preset parameters.

You can preset system operating status, configuration parameters of each exam mode, post process and others. The system runs automatically with the preset parameters after each startup. Before examining patients, ensure proper parameters have been preset.

3.1 Screen Display



Operating & Setting

| No. | Part | Description |
|-----|--------------------------|--|
| 1 | Echo Area | The echo image showing here |
| 2 | PROB | PROB: SEC-18 |
| 3 | FREQ: 3.5MHz | The current probe's working frequency |
| 4 | Current Image Parameters | <ul style="list-style-type: none"> • GAIN --- The current Over-all Gain setting • * --- Set Brightness of the screen • ● --- Set Contrast of the screen • IC0 --- Image coded-color • CC0 --- Character color • BC0 --- Screen background color (see Article 3.7 Parameters Setting) |
| 5 | FREEZE | Defining the echoes is in real-time or frozen |
| 6 | DEP: 180 | Current Scanning depth |
| 7 | Annotations | <ul style="list-style-type: none"> • Hosp: ---- Hospital name • Name: ---- Patient name • AGE: --- Patient's age • SEX: --- Patient's sex by F and M defined |
| 8 | Current Date | Current date of the scanner (The date displayed on the frozen image is the date when the image is frozen) |
| 9 | Current Time | Current time of the scanner (The time displayed on the frozen image is the time when the image is frozen) |
| 10 | Battery Indicator | Current battery power indicator |

3.2 Operating Procedure

1. Turn on the scanner by switch on its power-switch on the rear panel.
2. There is the word "Welcome" showing on the screen. Then to press any one of key on the keyboard to have the system get into working-ready interface.
3. Press the key of "MENU" to input all the needed information of patient, such as HOSP, NAME, AGE and SEX.
4. Spread ultrasonic coupling agent on the probe acoustic shadow surface, and close to the scanning area, then the real-time image can be observed on the screen.
5. Freeze the image first when the measurement needed to be done on the image.

3.3 Power on/off

The power switch is located at right side of the scanner.

Press down the power switch, the indicator on and the interface "Welcome" appears on the screen. Press any key (except **FREEZE** and **Esc**) to enter the working status. Press it up and the indicator light turns off. The machine is off power supply.

Attention:

The cooling holes in the back cannot be covered. The device can be damaged by overheating.

3.4 Diagnose

Spread medical coupling agent (ultrasonic gel) on diagnostic area, and place the probe close to the area for diagnosis. The ultrasound image of the tissue section will be displayed on the screen. Move the probe and find out the right place. Adjust the gain to maintain the best image.

Attention:

1. Excessive force is not allowed while the probe touching diagnostic area, for it may damage the probe.
2. Use appropriate probe to diagnose.

3.5 General Setting

The parameters at the top right corner of the screen will be changed while you do the setting.

PROB: SEC-18
FREQ: 3.5MHZ GAIN: 31
IMO*: 36 30
IC0/CC0/BC0

3.5.1 How to set probe's working frequency?

- Press **4 ▶** and **5 ◀** to light "FREQ" as showing above first.
- Press **3 ▲** and **6 ▼** to select the needed frequency from 5.5/ 6.5/ 7.5MHz.

3.5.2 How to adjust the over-all gain?

- Press **4 ▶** and **5 ◀** to light "GAIN" first.
- Press **3 ▲** and **6 ▼** to select the needed frequency from 0~62. The default setting is on 30.

3.5.3 How to adjust the Brightness or Contrast?

- Press **4 ▶** and **5 ◀** to light "Brightness" or "Contrast" first.
- Press **3 ▲** and **6 ▼** to select the needed Brightness from 38~64.
- Press **3 ▲** and **6 ▼** to select the needed Contrast from 26~82. The default

Important:

- All above setting can be memorized automatically and the system will be under the previous settings when you turn on the machine again.
- The imaging quality is best when it is under its default setting. You are strongly suggested to not adjust "Brightness" nor "Contrast" if they are hardly needed.
- You can have the system back to DEFAULT setting whenever you are confused with the setting.

3.5.4 How to back to Default setting?

V1.20

0. NAME
1. AGE
2. SEX
3. COMMENT
4. TIME
5. HOSP
6. LANGUAGE
7. BODYMARK
8. REPORT
9. NEWPATIENT

- Press **FREEZE** first, the signal **FREEZE** will be shown at the right bottom of the screen.
- Press **MENU** key to generate the main menu displayed on the screen.
- Choose "8. Default Tset" by pressing number **BB/8** key. The system will be back to the default setting.

3.5.5 Annotation

- **Name Input**

Choose **0. NAME** by pressing M/0. There is sub-menu shown at the bottom of screen.

PLEASE ENTER NAME:
|

0-A 1-B 2-C 7-D 8-E 9-F

Select the number key to choose the needed character to fulfill the name.

Operating & Setting

Press **6** ▼ or **3** ▲ to turn pages for more characters choosing.

| | | | | | | |
|-----------|-----|-----|---------|-----|-----|-----|
| 1st Page: | 0-A | 1-B | 2-C | 7-D | 8-E | 9-F |
| 2nd Page: | 0-G | 1-H | 2-I | 7-J | 8-K | 9-L |
| 3rd Page: | 0-M | 1-N | 2-O | 7-P | 8-Q | 9-R |
| 4th Page: | 0-S | 1-T | 2-U | 7-V | 8-W | 9-X |
| 5th Page: | 0-Y | 1-Z | 2-SPACE | | | |

Press **Clear** to erase the wrong letter(s) input previously.

Press **MENU** to confirm the characters chosen and the needed ones will be showing at the top screen in **NAME** item.

- **Age Input**

Choose **1. AGE** by pressing **Q /1**. There is sub-menu shown at the bottom of screen.

PLEASE ENTER AGE:

|

Press the needed numbers. The max three bytes allowed to be input here in this system.

Press **Clear** to erase the wrong number(s) input previously.

Press **MENU** to confirm and the need number will be showing at the top screen in AGT item.

Operating & Setting

- **Sex Input**

Choose **2. SEX** by pressing **+ 2**. There is sub-menu shown at the bottom of screen.

PLEASE ENTER AGE:
|

- **Comments Input**

Choose **3. COMMENT** by pressing **▲ 3**. The 1st page of character table will be shown at the bottom.

0-A 1-B 2-C 7-D 8-E 9-F

Press the arrow keys **3 ▲**, **6 ▼**, **5 ◀**, **▶ 4** to move the cursor to the wanted position first.

Press Reference or Measurement to turn pages for more characters choosing.

| | | | | | | |
|-----------|-----|-----|---------|-----|-----|-----|
| 1st Page: | 0-A | 1-B | 2-C | 7-D | 8-E | 9-F |
| 2nd Page: | 0-G | 1-H | 2-I | 7-J | 8-K | 9-L |
| 3rd Page: | 0-M | 1-N | 2-O | 7-P | 8-Q | 9-R |
| 4th Page: | 0-S | 1-T | 2-U | 7-V | 8-W | 9-X |
| 5th Page: | 0-Y | 1-Z | 2-SPACE | | | |

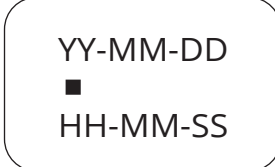
Press **CLEAR** to erase the wrong letter(s) input previously.

Press **MENU** to confirm the characters chosen and the needed ones will be showing at the top screen in NAME item.

Operating & Setting

- **Current time**

Select **4. TIME** by pressing  /4 , the following sub-menu appears on the screen:



YY-MM-DD
■
HH-MM-SS

2 bytes allowed in each item. Input "13" to indicate the current year.
24 hours setting for the current time.

The cursor will be switched to the next line for real-time clock setting.

Press **CLEAR** key to erase the previous letter(s) if needed.

Press **MENU** key to confirm the setting the re-setting the current time will be showing at the left top corner of the screen automatically.

- **Hospital Name (Farm Name)**

(Same procedure as NAME input)

- **Erase saved images**

Select **8. ERASE** by pressing the key of  , the following sub-menu appears on the screen:



ERASE ALL STORAGE?
1.YES 2.NO

Select 1 or 2 by pressing its related numerical key "1" or "2".

There is a prompt in words of "ERASING..." appeared on the left top of screen when "1" is selected. Any operation is forbidden when this prompt is on.

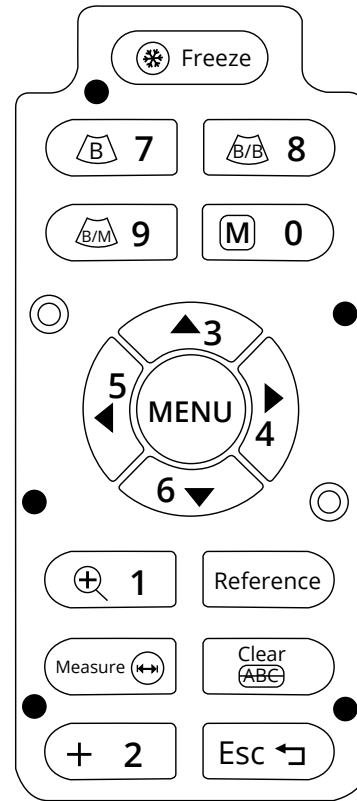
This prompt will be disappeared automatically when it Attention:

Attention:

All above setting would be saved automatically and the system will remain the previous setting when you turn on the machine again.

3.6 Keyboard

This is an image of the device keyboard:



Keyboard of V12

-  **Freeze Key**

Press it to freeze/UNfreeze the echo image.

If **FREEZE** is righted at the lower corner of the screen, the image is at frozen status.

-  ~  **Alphanumeric keys**

All of them are dual function keys.

Function keys are effective when the system is in real-time. The description of the different keys will be below.

As alphanumeric keys:

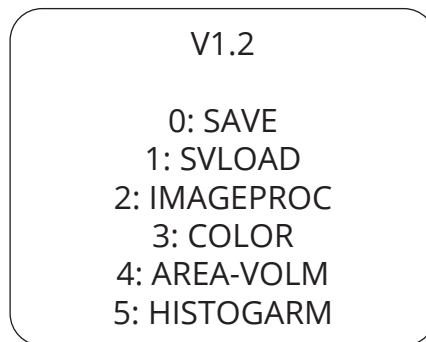
- They are for selection in the sub-menu while in menu operation.
- They are for number keys while in "AGE" and "TIME" menus.
- The keys, **M/0** **9/1** **+/2** **B/7** **BB/8** **BM/9** are for alphanumeric inputting while in "Hospital" and "Patient" annotations (Further details are available).

Operating & Setting

As functions keys:

- **M 0** (when the scanner is in real-time)

Press it when the system is in B+M mode, then it will be switch to M mode.
Press it when it is in B, B+B mode, the following function menu will be generated on the screen.



See Article 3.8 for more details about Function Menu.

- **M 0** (when the scanner is frozen)

Press Freeze first, then press MENU; the main menu will be shown on the screen.

- **+ 1** **Image Magnification** (available in real-time)

Press it to have the image magnified at different depth when the scanner is in real-time status.

The depth range is between 65~190 mm in 8 difference levels.

The eight (8) levels are as: 190-180-160-140-120-100-80-65mm.



- **+ 2** **Caliper**

Press it to generate a caliper "+" shown on the screen when [Freeze] lighted.



Operating & Setting

-  ~  **Direction Keys**



These 4 keys are all multifunctional.

When the system is in real-time B mode, press  and  to scroll the image up and down.

When the system is in measurement program, press them to move the caliper “up/down” and “left/right”.

When the system is in annotation of “Patient” and “Hospital”, press  and  to turn the page up and down.

When the system is in real-time, press  and  to select and light the parameter on the right side of the screen.

Then, press  and  to adjust it up and down.

-  **B Mode**

(The default setting of the system is in B mode)

Press it to have the scanner in B mode whenever it is in real-time or frozen.

-  **B+B Mode**

Press it to have the screen into B+B mode whenever it is in real-time or frozen. One of them is in real-time and another is in frozen.



Press it again to shift them between real-time and frozen.


Press [Freeze] key to have this real-time image frozen. Then the both B images are all in frozen status.

-  **B+M Mode**

Press it to B+M mode on whenever it is in real-time or frozen. Both B and M are all in real-time, B is on the left and M is in on the right.

There is a vertical line with dots on B mode, which is named SAMPLE Line.

Press  and  keys to move this line to the wanted position.

Then, press  again to have clearly M track shown on.

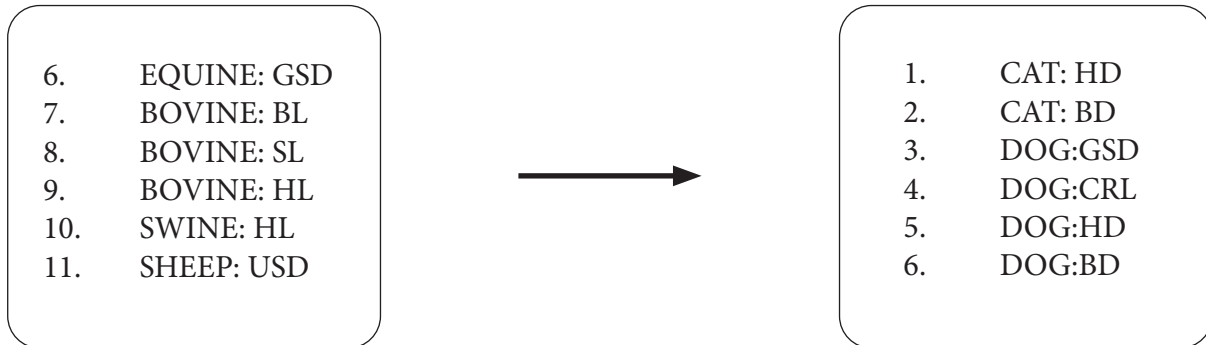
Press  repeatedly to switch the screen between **B+M** and **M mode**.

The sample line also can be moved by the trackball when it is connected with the scanner. Trackball is the optional accessory of this device.

Operating & Setting

- **Reference** **Reference Key** (when scanner is freeze mode)

Press "Reference" then the measurement menu is displayed on the screen. There are two pages in the menu. Press "Reference" once again to turn to the 2nd.



Select the number you need to choose the right item for the measurement. Reference Article 2.4 for more details about the procedure. Press **Clear** to exit.

- **Measure** **Measure Reference** (when scanner is frozen)

When the scanner is in frozen, this key is for function of Measure Reference. Reference Article 2.7 for more details. Press **Clear** to exit.

- **Clear** **Clear Key**

Press it to clean marks, comments and measure, even empty the report when scanner is in annotation.
Press it to exit the current program when scanner is menu operation.
Reference difference operation carefully.

- **Esc** **Reset**

Press it when the device crashes by accidents or operation mistakes, then the device can return to normal.

3.7 Parameters Setting

The parameters listed on the right side of the screen are all could be re-set by the operator when the system is in real-time.

PROB: SEC-18
FREQ: 3.5MHZ
GAIN: 31
IMO
□: 36 □ 30
IC0/CC0/BC0

Press key ◀ 5 and ▶ 4 to light the item you want to do modification. These items are cycle design tube lighten by press these two keys.

Press key ▲ 3 and ▼ 6 to set the wanted parameters.
The re-setting parameters are showing in numbers at the left top corner of the screen automatically.

3.7.1 How to set probe frequency?

Press ◀ 5 or ▶ 4 to light FREQ first.
There are three frequencies 5.5/ 6.5/ 7.5 for your choice. Press ▲ 3 and ▼ 6 to make the selection.

3.7.2 How to set Gain?

Press ◀ 5 or ▶ 4 to light GAIN first.
Press ▲ 3 and ▼ 6 to make the selection.
The adjustment range is 00~62.
The default-set is 30.

3.7.3 How to set Brightness & Contrast?

Press ◀ 5 or ▶ 4 to light ☀ or 🗨 first.
Press ▲ 3 and ▼ 6 to make the selection.
You are suggested not to make modification frequently if you are not with rich experience.
The default-set are all in 32.

Operating & Setting

3.7.4 How to set the Image coded-color?

Press key **M / 0** to generate the function menu appeared on the screen.

V 1.2

1. Save
2. SVLOAD
3. IMAGEPROC
4. COLOR
5. AREA-VOLM
6. HISTOGRAM

Press key **▲ 3** to light IC0 first. IC is the short for Image Color. There are 4 different coded-color designed in this system. Press **▲ 3** and **▼ 6** to make the selection.

IC0: black/white
IC1: red
IC2: yellow
IC3: blue

The default-set is on IC0 (black/white).

3.7.5 How to set the character's color?

Press key **M / 0** to generate the function menu appeared on the screen.

V1.2

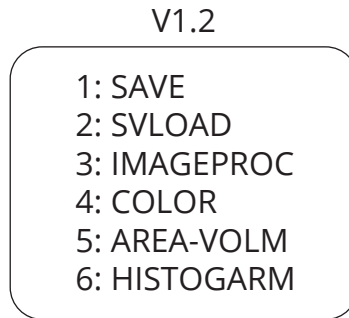
- 0: SAVE
- 1: SVLOAD
- 2: IMAGEPROC
- 3: COLOR
- 4: AREA-VOLM
- 5: HISTOGARM

Press key **▲ 3** to light CC0 first. CC is the short for Character Color.

There are 2 different color designed in this system. Press **▲ 3** and **▼ 6** to choose "0" for white color and "1" for yellow color. The default-set is on CC0 (white).

3.7.6 How to set the color of screen background?

Press key **M / 0** to generate the function menu appeared on the screen.

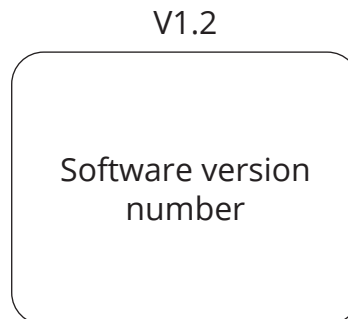
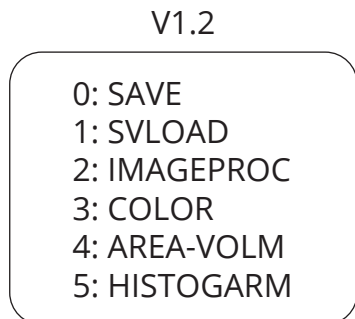


Press key **▲ 3** to light BC0 first. BC is the short for Background Color.

There are 2 difference color designed in this system. Press **▲ 3** and **▼ 6** to choose "0" for grey color and "1" for deep blue color.
The default-set is on BC0 (grey).

3.8 Functions Menu

No matter the scanner is in real-time or frozen, press **M/0** to display **FUNCTION MENU** on the screen. Under this menu, the functions in accordance with the menu will be done.



3.8.1 Image Save

Press **FREEZE** key first to lighten FREEZE on the bottom right screen.

Then press **M / 0** key to generate FUNCTION MENU on the screen.

Select "0.SAVE" by pressing the key of **Q / 1**. There is sentence showing on the left top of screen "SAVING ...". This sentence will be disappeared when the image is saved properly.

The max. 128 images can be saved permanently in the built-in memory.

The saved images are recorded in 1~3 bits number from "01" to "127" in turn.

For example:

If there are 128 images previously saved already, the next one only can be saved as 24.

A Questioning Window will be shown on the screen if the memory is full.

STORAGE IS FULL. ERASE NO.01?

1. YES 2.NO

▶ Choose "1" by pressing **Q / 1**. The current image will be saved as No.01. The previous one is erased automatically.

▶ Choose "2" by pressing **+ / 2**. The current saving is stop. Then the system will ask you for "ERASE NO.02", if not, again asking for NO. 03.... , and so on.

Press key **FREEZE** again to have the machine back to real-time.

Notes:

You are suggested to pick out some images when the memory is full, otherwise the questioning window will be generated on the screen from time to time.

3.8.2 Image Review

Press **M / 0** to have **FUNCTION MENU** displayed on the screen.

Select "1. UNLOAD" by pressing the key of **+ / 2** , the sub-menu appeared on the screen:

PLEASE ENTER STORAGE NO.:
1

Input the number you selected. The maxi records in the memory is from 1~128.

Press **Clear** to erase the wrong number(s).

The selected image will be re-shown on the screen and 9/128 will be displayed in the bottom left screen. "9" is saved code for the current image and "128" stands for the storage volume.

At this time, press **▲ 3** or **▼ 6** to pick up images in the memory one by one.

Press **Freeze** to exit and the system is back to real-time statue.

3.8.3 Image Procession

This function is not available when the system is not in real-time.

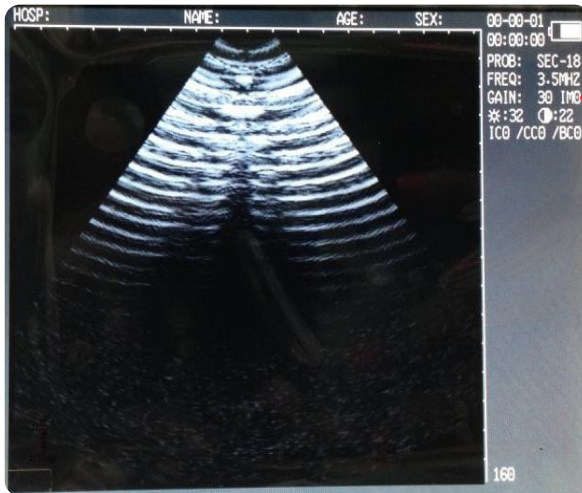
Press **M / 0** to have **FUNCTION MENU** displayed on the screen.

Select "**2. IMAGE PROC**" by pressing the key of **+ 2.**

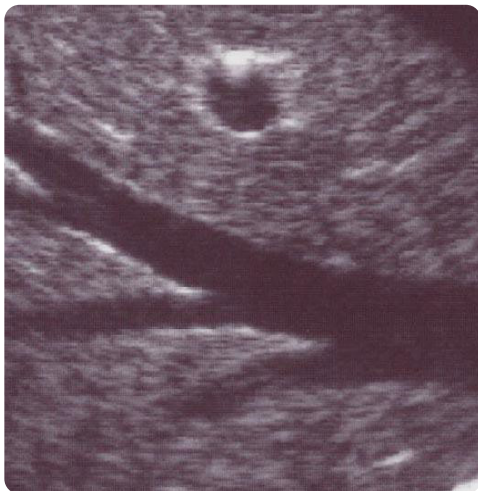
Repeat **+ 2** key to select the 2nd presetting, and the third pressing **+ 2** key to choose 3rd presetting.

The signal "IM0" at the right top of the screen will indicate which presetting on the current image.

Operating & Setting



IM0.
IM1.
IM2.
IM3.



Normal



smooth

3.8.4 Color

(see Article 3.7.4, Article 3.7.5 and Article 3.7.6 for more details)

3.8.5 Area-Volume

(see Article 3.9.2, Article 3.9.3 and Article 3.9.4 for more details)

3.8.6 Histogram

Press **FREEZE** key first to lighten **FREEZE** on the bottom right screen.

Then press **M / 0** key to generate **FUNCTION MENU** on the screen.

Select "7.HISTOGRAM" by pressing the key of **5** **◀**. There is a square frame appeared on the screen.

Move this square frame by press **▲ 3** or **▼ 6** and **5** **◀** or **▶ 4** to the interested position on the image.

Press [Measure] key on the keyboard to dictate the calculation, and its statistics result will be displayed on automatically on the bottom right of screen.

PT ---- the totality pixel in the frame.

GM ---- the gray value at the peak.

PM ---- the number of pixel at peak.

Press **CLEAR** to exit.

3.9 Measurements

3.9.1 Distance Measurement

- **Keyboard Operation:**

Press **FREEZE** key to have the image in frozen first.

Press **+ / 2** in freeze mode, the caliper "+" is displayed on center of the screen.

Press the arrow keys **▲ 3** , **▼ 6** , **5** **◀** or **▶ 4** to move this caliper to the wanted position to be the starting point.

Press **Measure** to confirm this spot for distance measurement.

Again press the arrow keys **▲ 3** , **▼ 6** , **5** **◀** or **▶ 4** to move the caliper to the ending point.

There is a line with dots along moving of the caliper. The distance between two dots is 10mm.

Press **Q / 1** to finish this measurement. Then the distance measurement result between the starting and ending point will be shown at the right-side of the screen "+D1= 45mm".

Operating & Setting

You are allowed to do maximum 4 group measurements on the same image with difference calipers as "+", "x", "#" and "•". The measuring results will be shown at its related items. Such as:

| | |
|---|-----------|
| + | D1 = 45mm |
| x | D2 = 35mm |
| # | D3 = 20mm |
| • | D4 = 33mm |

Press **Measure** key to switch the starting and ending point each other.



The ratio between these four distances will be shown on its items when the measurements are done.

Press **Clear** key to clear the measuring marks and lines on the screen. The echo image will be kept on there.

• Mouse (Trackball) Operation:

Press Left Button and the caliper displayed on the screen.

Move the ball to have the caliper to be the starting point.

Press Right Button to set the starting point.

Move the ball to have the caliper to be the ending point. There is a line with dots along moving the ball.

Press **Q/1** to finish this measurement.

The distance result between the starting and ending point will be shown at the right-side of the screen "+D1= 45mm".

Operating & Setting

Repeat pressing Right Button can shift between the beginning and ending points. Maximum 4 group distance measurements allowed to be done on the image with difference marks as "+", "x", "•" and "#". The measuring results will be shown at its related items. Such as:

| | |
|---|-----------|
| + | D1 = 45mm |
| x | D2 = 35mm |
| # | D3 = 20mm |
| * | D4 = 33mm |

The ratio between these four distances will be shown on its items when the measurements are done.

Press Clear key to clear the measuring marks and lines except the echo image on the screen.

3.9.2 Area-Volume Measurement

Freeze the image first.

Press **M/0** to have FUNCTION MENU displayed on the screen.

Select "4.AREA-VOLM" by pressing the key of **▶ 4**. The below sub-menu will be displayed on screen:

PLEASE ENTER:
1.FREEHAND 2.ELLIPSE

There are 2 ways available for your choice to do Area/Volume Measurement: by freehand or by Ellipse.

• By Free hand:

- * Press **Q/1** to select the way by Freehand:
A caliper will be shown on the screen. Move the caliper to the starting point first with the arrow keys **▲ 3**, **▶ 4**, **5 ◀**, **▼ 6**.
- * Press **Measure** and arrow keys **▲ 3**, **▶ 4**, **5 ◀**, **▼ 6**. There will be a trace along the focus edge.
- * Press **Measure** again to end this measurement.
- * Press **M/0** key to be back to Function MENU and choose "4. ARE-VOLM" again, another measurement can be done.
- * The measure result(s) will be shown automatically at the left side of screen.

Operating & Setting

- **By Ellipse:**

- * Press **+ / 2** to select the way by Ellipse:
- * A caliper will be shown on the screen.
- * Move this ellipse to the focus with the arrow keys **▲ 3** , **▶ 4** , **5 ◀** , **▼ 6** .
- * Press **Measure** , the arrow keys are activating to adjust the ellipse size.
To enlarge it by pressing **▲ 3** and **▼ 6** keys in vertically.
To narrow it by pressing **▶ 4** and **5 ◀** keys in horizontally.
- * One more pressing of **Measure** , the arrows keys are activating to adjust the ellipse angle.

To turn its angle anticlockwise by **5 ◀** , and clockwise by **▶ 4** .

- * Third pressing of **Measure** , the arrow keys are back to move the ellipse up/down/left/right again.
- * Adjust the ellipse till it matches the focus.
- * Press **M / 0** key to be back to Function **MENU** and choose **"4. ARE-VOLM"** again, another measurement can be done.
- * The measure result(s) will be shown automatically at the left side of screen.

The ratio between these four groups will be shown on its items when the measurements are done.

| | |
|--------|-------------------------|
| A1/C1: | perimeters of 1st group |
| A2/C2: | perimeters of 2nd group |
| C1/C2: | ratio of two perimeters |
| A1/A2: | ratio of two areas |

Notes:

There would be limitations in this measurement with arrow keys.
You are suggested to buy the optional trackball for easy and simple operation.

3.9.3 Volume Measurement

Two methods are available in this machine for measuring the volume.

By 3 axis method

The distance should be measured for three times before the volume measuring, and then press **M/0** to obtain the value.

If the data are less than three groups, there will be no value displaying when you press **M/0**; If you input four groups of data and then press **M/0**, the value displayed is the calculating result of the first three groups (D1, D2, D3).
Procedures: <Kidney as example>

1. Catch the cross and longitudinal sections of the kidney respectively and freeze them.
2. Measure the long axis and short axis of the cross section by means of distance measuring.
3. Measure the diameter of the longitudinal section by means of distance measuring.
4. Press **M/0** to complete the measuring, with the value of volume in "Vm1" on the right side, as follow:



Illustration of volume measuring (3 Axis Method)

Operating & Setting

- **By Ellipse Method**

Procedures: (Kidney as example)

1. Catch the cross and longitudinal sections of the kidney and freeze.
2. Measure the perimeter and area of cross and longitudinal sections.
3. The system will automatically complete the measuring, with the value of volume in "Vm1" on the right side, as follow:

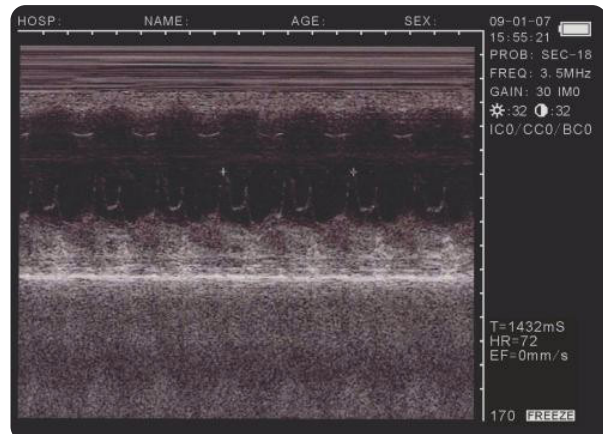
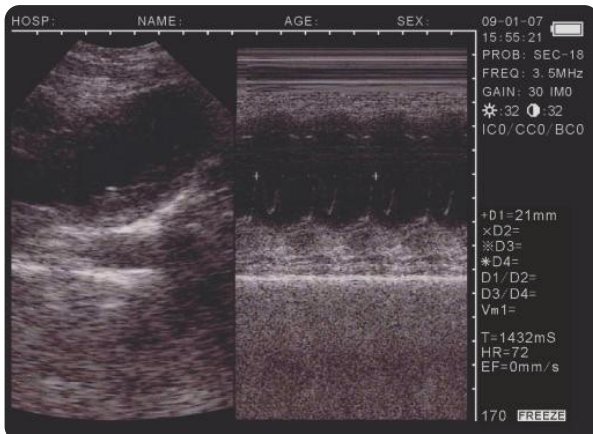


Illustration of Volume Measuring (Ellipse Method)

3.9.4 Heart Rate Measuring

(Only available in "B/M", "M" Modes)

- In B/M mode, freeze a satisfying cardiograph.
- Measure the distance between wave crests of two periods by means of distance.
- Measuring method, and 3 groups of data will be displayed in the lower right-hand corner.
- The marks are respectively: Time T (unit:ms). Heart Rate HR (unit: /m). Slope EF (unit:mm/s).



3.10 Histogram

Freeze the image first.

Press **M/0** to have **FUNCTION MENU** displayed on the screen.

Select "5.HISTOGRAM" by pressing the key of **◀/5**, a sampling window displayed:
Press the arrow keys to move this window to the area where needed for checking.

Press **Measure** on keyboard of scanner.

Press **Q/1** or **+/2** key to enlarge or narrow this window.

Press **Clear** to exit.



PT stands for the total number of pixels in the rectangular window.
Gm stands for the grey scale of the curve at the peak of the y axis.
Pm stands for the number of pixels in Gm grey scale.

- X axis stands for grey scale, and y axis stands for number.
- From the above figure, in the rectangular area, the total number of pixel dots is 10000. At scale 52, there are 327 dots, the most image pixel dots.

3.11 OB Calculation

The device is capable of measurement on GA of equine, bovine, sheep, swine, cat and dog, and so on. The GA (GW) can be acquired after measuring GS, BL, HL, SL, USD, HD, BD, CRL etc., among them, the EDD of cat and dog will be given.

Operation process:

Freeze the image first.

Press Reference key to generate VET OB menu show on the screen. There are two pages for this menu to be selected.

Pressing Reference key to switch these two pages displaying on the screen.

1st Page:

0. EQUINE : GSD
1. BOVINE : BL
2. BOVINE : SL
3. BOVINE : HL
4. SWINE : HL
5. SHEEP : USD

2nd Page:

0. CAT : HD
1. CAT : BD
2. DOG : GSD
3. DOG : CRL
4. DOG : HD
5. DOG : BD

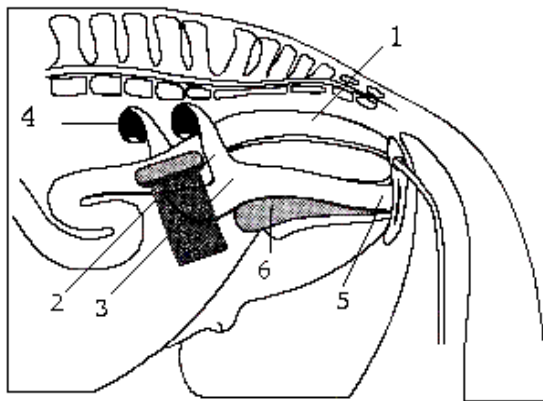
- **EQUINE-GSD:** Calculate the gestation age according to horse GS

Input the number and select the related OB menu and acquire the distance as per distance measurement method. The corresponding GA result displays behind "G·A=" on screen right, and the EDD displays behind "EDD=" as given below in details:

Examination steps on equine:

1. Clear off the rectum area.
2. Feel the pregnancy with hand and give a primary estimation and confirm using the ultrasound.
3. Hold the probe closely and put it into rectum and ensure that your hand can feel the coming change inside rectum. Keep hand closing to the back and between the probe and rectal wall.
4. The inner construction of equine displays on the screen, bladder lies in the portrait cross place and the behind is uterine horns and body. From the horizontal view, uterine horns are in shape of round usually. Move the probe around to acquire a better observation on the joint of uterine horns and body, and then switch the probe to uterine horns as the following figure shows:

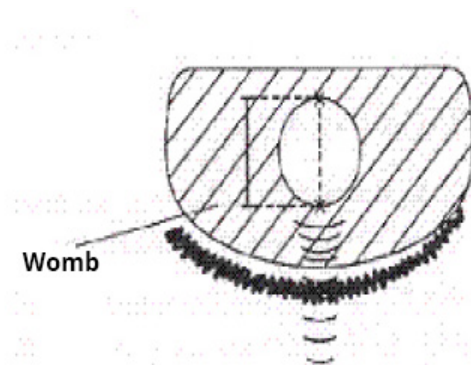
Operating & Setting



1. Rectum
2. Uterine horns
3. Uterine bodies
4. Ovaries
5. Vagina
6. Bladder

Probe position for uterine and ovaries examination

5. The measurement method of GS diameter is given below and measurement can be done horizontally or vertically.



Equine GA measurement

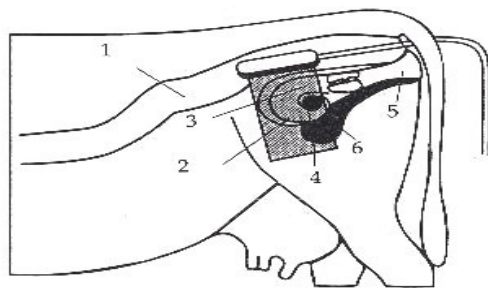
6. Confirm the distance value as per distance measurement methods and the corresponding data display behind "G·A". With this measurement to set up a chart to find the growth curves to estimate embryo size and GA. Here GA refers to the duration from the copulation instead of impregnation.

Operating & Setting

- **BOVINE-BL:** Calculate the gestation age according to bovine BL

Examination steps on bovine:

1. Clear off the rectum area.
2. Feel the pregnancy with hand and give a primary estimation and confirm using the ultrasound.
3. Hold the probe closely and put it into rectum and ensure that your hand can feel the coming change inside. Keep hand closing to the back and between the probe and recta wall.
4. The inner construction of bovine displays on the screen, bladder lies in the portrait cross place and the behind is uterine horns and body. From the horizontal view, uterine horns are in shape of round usually. Move the probe around to acquire a better observation on the joint of uterine horns and body, and then switch the probe to uterine horns as the following figure shows:



- | | |
|---|----------------|
| 1 | Rectum |
| 2 | Uterine horns |
| 3 | Uterine bodies |
| 4 | Ovaries |
| 5 | Vaginas |
| 6 | Bladders |

Probe position for uterine and ovaries examination

5. To measure the fetus body diameter, select a vertical section first, that is a section from two sides to the neck, chest and abdomen. Body diameter can be acquired when the GA is between 60 to 150 days.

The measurement method of body diameter is given below:

Body diameter

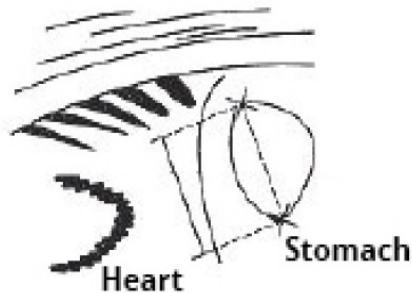


BL measurement

6. Confirm the distance value as per distance measurement methods and the corresponding data display behind "G·A".

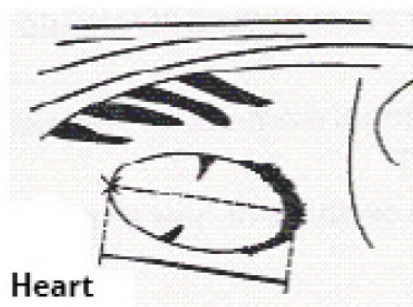
Operating & Setting

- **BOVINE-SL:** Calculate the gestation age according to bovine SL
 1. Keep the bovine standing.
 2. Put the probe against the abdomen side center, shift it a little bit left or right and hold it closely against the skin. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
 3. The maximum vertical axial of the stomach should be displayed on the screen. With the time going on, fetus stomach long axial increases.



Bovine stomach measurement

- **BOVINE-HL:** Calculate the gestational age according to bovine HL
 1. Keep the cow standing.
 2. Put the probe against the abdomen side center, shift it a little bit left or right and hold it closely against the skin. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
 3. The maximum vertical axial of the heart should be displayed on the screen. With the time going on, fetus heart long axial increases regularly. The measurement method is given below:



Bovine heart measurement

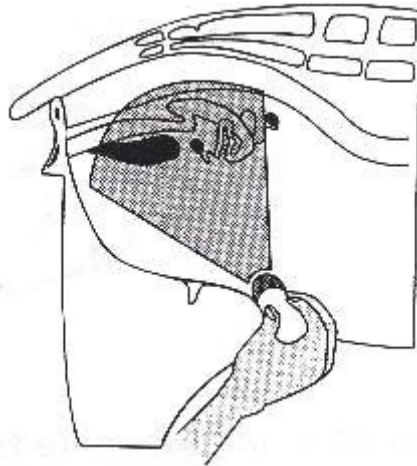
4. Confirm the distance value as per distance measurement methods and the corresponding data display behind "G·A".

Operating & Setting

- **SWINE-HL:** Calculate the gestation age according to bovine HL

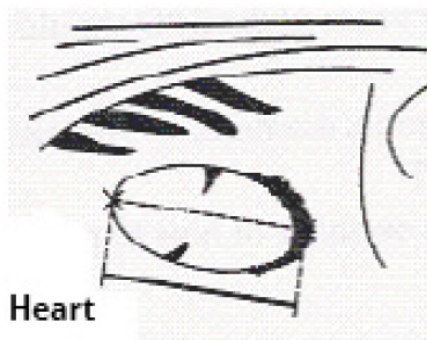
Check routine on pigs:

1. Keep the pig standing.
2. Put the probe, a little bit left or right of the center, on the ventral abdominal wall closely along the side of teats and skull to rear leg. If there is mud on this part, clean with water first in case the abdominal pelvic structure could not be displayed accurately.



Swine GA measurement

3. To measure the heart macro-axis, screen should display the maximal longitudinal axis of heart. With the growth of gestation age, the fetal heart macro-axis increase regularly. Measuring method is given in the following figure:



Swine Heart measurement

4. Measure selected parameter distance according to distance measurement method; the corresponding gestation age data will automatically show behind "G·A".

Operating & Setting

- **SHEEP-USD:** Estimate gestation age according to hilus-spine length of sheep

There are two methods to exam pregnant sheep:

Use convex or linear probe to check abdomen and endo-rectal probe to rectum. These two methods are the same useful. It is proofed as cording to some publication that these two methods are the same effective in pregnancy examination.

- Rectum examination is more exact than abdomen examination within first 35 days pregnancy.
- The two methods are the same effective between 35 to 70 days pregnancy.
- After 70 days pregnancy, abdomen examination is better because it is more practical when the uterine becomes large.

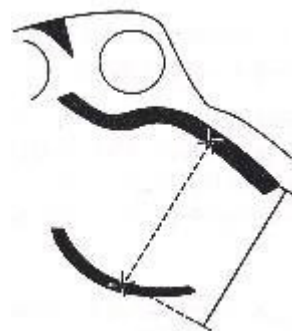
Abdomen check:

1. Abdomen examination can be done when the sheep is standing or lying or seating. Put the probe against the appointed abdomen center where there is no fur.
2. Clean the abdomen skin if there is mud to ensure a clear display of the abdominal pelvic structure.
3. Measure the length of USD.
4. Confirm the distance value as per distance measurement methods and the corresponding data display behind "G·A".

- **CAT-HD:** Calculate the gestation age according to cat HD

Head diameter refers to the maximum inner skull diameter from the side of abdomen to back. This value can be acquired within 8-month pregnancy.

The HD measurement is given below:



Cat HD measurement

Operating & Setting

- **CAT-BD:** Calculate the gestation age according to cat BD

After fetal head formed, binary top diameter measurement becomes a routine in ultrasonic examination. The measuring method is:

1. Fetal head axial plane scanning, look for BPD measuring standard plane from top to bottom.
2. According to distance measurement method to measure distance of selected parameters, the corresponding gestation age data will automatically show behind "G·A".

- **DOG-GSD:** Calculate the gestation age according to dog gestation sac diameter (The method is the same as that of equine).
- **DOG-CRL:** Calculate the gestation age according to dog CRL (The method is the same as that of cow).
- **DOG-HD:** Calculate the gestation age according to dog HD (The method is the same as that of cat).
- **DOG-BD:** Calculate the gestation age according to BD (The method is the same as that of cat).

Tips: After display the OB menu, press Clear key to exit.

Note:

At OB measurement, when the distance is less than the following value, the GA of this animal will not display. Refer to the following table for detailed data:

| | |
|-----------|---------|
| EQUINE | D1<6mm |
| BOVINE-BL | D1<8mm |
| BOVINE-SL | D1<1mm |
| BOVINE-HL | D1<3mm |
| SHEEP | D1<15mm |
| SWINE | D1<31mm |
| CAT-HD | D1<15mm |
| CAT-BD | D1<17mm |
| DOG-GSD | D1<1mm |
| DOG-CRL | D1<1mm |
| DOG-HD | D1<14mm |
| DOG-BD | D1<16mm |

4. Checking & Maintenance

4.1 Appendix C Obstetrics

Gestational Table 1:
Equine

All measurements +/- 3 days

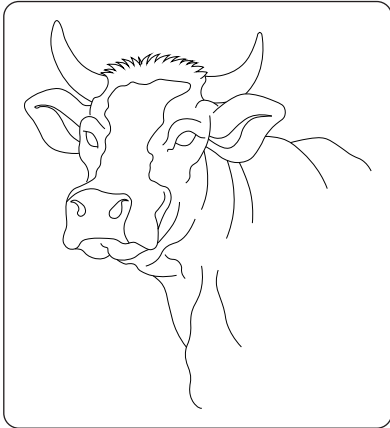


| Measurement (mm) | Week | Day |
|----------------------------|------|-----|
| (Gestational Sac Diameter) | | |
| 6 | 1 | 4 |
| 8 | 1 | 4 |
| 10 | 1 | 5 |
| 12 | 1 | 6 |
| 14 | 1 | 6 |
| 16 | 2 | 0 |
| 18 | 2 | 0 |
| 20 | 2 | 1 |
| 22 | 2 | 2 |
| 24 | 2 | 3 |
| 26 | 2 | 5 |
| 28 | 4 | 1 |
| 30 | 4 | 2 |
| 32 | 4 | 3 |
| 34 | 4 | 4 |
| 40 | 5 | 0 |
| 42 | 5 | 2 |
| 44 | 5 | 3 |
| 46 | 5 | 4 |
| 48 | 5 | 5 |
| 50 | 5 | 6 |
| 52 | 6 | 1 |
| 54 | 6 | 2 |
| 56 | 6 | 3 |

Checking & Maintenance

Gestational Table 2: Bovine

All measurements +/- 3 days



| Measurement (mm) | Week | Day |
|------------------|------|-----|
| (Body Length) | | |
| 8 | 4 | 0 |
| 10 | 5 | 0 |
| 12 | 5 | 1 |
| 14 | 5 | 2 |
| 16 | 5 | 3 |
| 18 | 5 | 5 |
| 20 | 5 | 5 |
| 22 | 5 | 6 |
| 24 | 5 | 6 |
| 26 | 6 | 1 |
| 28 | 6 | 1 |
| 30 | 6 | 1 |
| 32 | 6 | 2 |
| 34 | 6 | 3 |
| 36 | 6 | 3 |

Checking & Maintenance

Gestational Table 3: Sheep

All measurements +/- 3 days



| Measurement (mm) | Week | Day |
|-------------------------------|------|-----|
| (Umbilicus to Spine Distance) | | |
| 15 | 7 | 1 |
| 18 | 7 | 3 |
| 21 | 7 | 6 |
| 24 | 8 | 1 |
| 27 | 8 | 4 |
| 30 | 9 | 0 |
| 33 | 9 | 2 |
| 36 | 9 | 4 |
| 39 | 10 | 0 |
| 42 | 10 | 2 |
| 45 | 10 | 5 |
| 48 | 11 | 3 |
| 51 | 11 | 5 |
| 54 | 12 | 1 |
| 57 | 12 | 2 |
| 60 | 12 | 4 |
| 63 | 12 | 6 |
| 66 | 13 | 2 |
| 69 | 13 | 4 |
| 72 | 14 | 2 |
| 75 | 14 | 4 |
| 78 | 15 | 0 |
| 81 | 15 | 2 |
| 84 | 15 | 5 |
| 87 | 16 | 6 |
| 90 | 17 | 0 |
| 93 | 17 | 1 |
| 96 | 17 | 3 |
| 99 | 17 | 6 |

4.2 Main unit maintenance

- If device enclosure needs cleaning shutdown the device first and then wipe with alcohol sponges.
- Device should not turn on and off frequently.
- When the device does not work for a long time, pack the device according to the instructions on the packing. Store it properly in the warehouse.

4.3 Probe maintenance

- Probe is an expensive part and frangible. Never hit it or drop it on floor.
- Please use medical ultrasound gel during diagnosis. Do daily inspection on the probe enclosure to see if it is cracked and avoid liquid leakage to spoil the built-in components.
- When diagnoses pauses, put the probe in its case and press [Freeze] key to keep it in a state of "Frozen".

4.4 Cleansing

The use of ultrasound probes exposed to risks of contamination. Therefore, maintenance of the probe is essential. After using the device, remove the gel from the probe and clean it with a paper soaked in disinfectant detergent solution.

Never use solvents, pure alcohol (over 75%), bleach for cleaning the probes, which would cause damage.

The surface of the ultrasound should be cleaned with a damp cloth and mild soap.

Warning:

To prevent accidents, take out the battery when cleaning the main unit enclosure and separate the device from the power supply network first and then clean the adapter enclose. Prevent all the plugs, sockets from water splash or soaking.

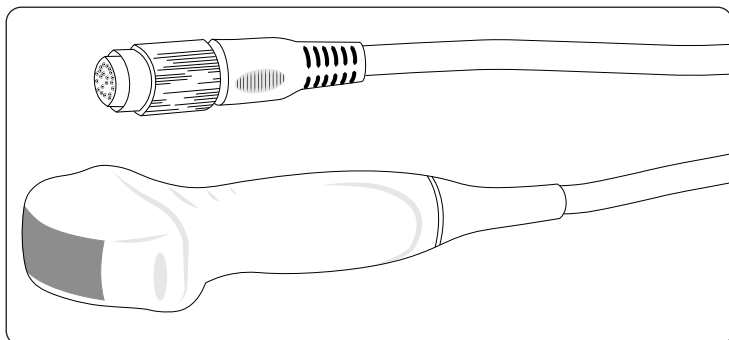
Warning:

Must not use extender, ethylene oxide or any other organic solvent, which tend to deface the probe's protective foil.
Keep device or probe from any type of liquid's infiltration. Must not clean device or probe by airing or heating.

5. Technical Specifications

| MODEL | | Ultrasound Scanner VM8 |
|------------------------------|------------|--|
| Probe | | Support of Multi-Frequency Probes |
| Detect Depth (mm) | | ≥140 |
| | | ≤4 (Depth≤80) |
| Resolution | Lateral | ≤1 (Depth≤60) |
| | | |
| (mm) | Axial | ≤1 (Depth≤80) |
| Blind zone (mm) | | ≤8 |
| | | |
| Geometric position precision | Horizontal | ≤5 |
| | Vertical | ≤5 |
| Device size | | 220 mm x 145 mm x 45 mm |
| Monitor size | | 5,5 inch, 13,97 cm |
| Display mode | | B, B+B, B+M, M, 4B |
| Image gray scale | | 256 |
| | | |
| Depth (mm) | | Max. Depth 220 |
| Measurement | | Gestational sac, body length, heart length, stomach length, umbilical ride length, head diameter, double top diameter, head and tail length and other parameters |
| Annotation | | Hospital, name, age and Sex. It is allowed for full screen editor |
| | | |
| Battery Capacity | | 2200mAh |
| | | 2,0 till 2,5 hours operating time |
| Mainframe power consumption | | 13W at non-charging/ 25W at charging |
| | | |
| Adapter power consumption | | 45W |
| | | |
| Main unit weight | | 700g |

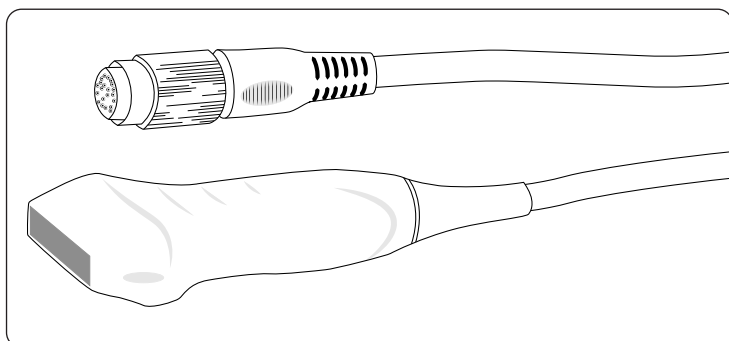
5.1 Probe Specifications



Convex Probe

3.5MHz

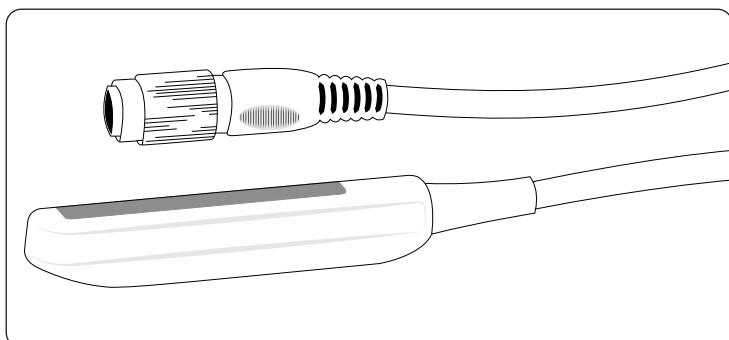
Item number: 5565



Linear Probe

5.5
7.5
8.5MHz

Item number: 5564



Rectal Probe

5.5
6.5
7.5MHz

Item number: 5563

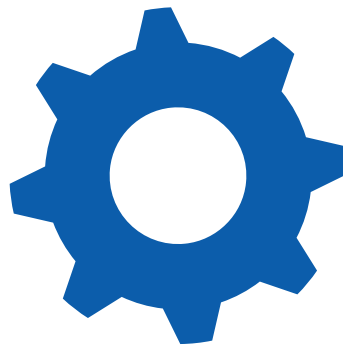
Technical Specifications

Note:

1. Do not use the system in the vicinity of strong electromagnetic field (like transformers), which may affect the performance of the monitor.
2. Using devices transmitting RF signals in the vicinity of the system may affect the system's performance. Do not use or take any devices intentionally transmitting RF signals such as cellular phones, transceivers and radio-controlled products in the room placing the system.
3. Transport, store and use the system under the circumstance specified in this manual. Additionally, store and use the system in a clean location where there is direct sunlight, sudden changes in temperature, condensation, dust, vibration, and heat generators.
4. After turning off the system, wait at least 10 seconds before turning it on again.
5. Before connecting/disconnecting the probe, turn off the system or stop emitting (freeze the image). Otherwise, the system or probe may malfunction.
6. After using the probe, remove the gel on it. Otherwise, water in the gel may enter the acoustic lens to adversely affect the performance and safety of the probe.
7. If the system is used in a small room, the room temperature may rise. Proper ventilation must be used.
8. Do not cover the fan outlet.
9. Only engineers of our company or authorized by our company can replace the fuses.
10. Do not modify system parameters. If it is necessary to change system parameters, contact our company's Customer Service Department or your local distributor.

Do you need any more information?

Manuals at www.berghoch.de



Any further questions?

Open a Support-Ticket at www.berghoch.de

or

contact us directly at (0231) 224 001 44
(Monday to Friday: 9 a.m. to 4 p.m.)

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