Provetscan CR-1A

Convex rectal reproductive diagnostic
for cattle and horses

Manual User

Introduction

The CR-1A wireless probes are cutting-edge ultrasound instruments for reproductive diagnosis.

Unlike traditional veterinarian ultrasounds with a cable connected to the probe, the CR-1A is wireless.

The CR-1A probe has a built-in ultrasound image processor, power source and wireless signal module to connect to the main unit.

Now, the main unit is replaced by a tablet. The probe acts as a WiFi access point and shows the image through the VetUS application.

The purpose of this manual is to provide a general overview. Read it carefully before using the device.

1. Features

Screen: iPad series
Scan: Linear
Probe: 3.5 / 5 MHz transducer
Depth: 100-190 mm
Display Mode: B Mode, BM mode
Grey scale: 256 levels
Battery life: 6 hours of continuous work, or 14 hours on stand-by.
Size of main unit: 180mm x 63mm
Examination wire length: 1.8 m.
Weight: 400 g

2. Start

For your protection, please read these safety instructions before starting up the probe.

2.1 Unpackaging

The CR-1A probe is carefully packaged to avoid damage during transport. Before opening the case, look for any visible damage on the outside that may have occurred during transport.

Items must be verified to ensure that they were all received. The table below shows the items that must be included:

Items	**Included**
CR-1A Ultrasound probe	✓
USB cable for charging	✓
Transport suitcase	✓
Wireless charger	✓

Each item must be examined to report defects or damage that may have occurred during shipping, despite careful packaging. If this occurs, please immediately contact your distributor to report the issue.

2.2 Installation the app

If the VetUS application is not installed on your tablet, please go to the App Store and search for it. Installation is free of cost.

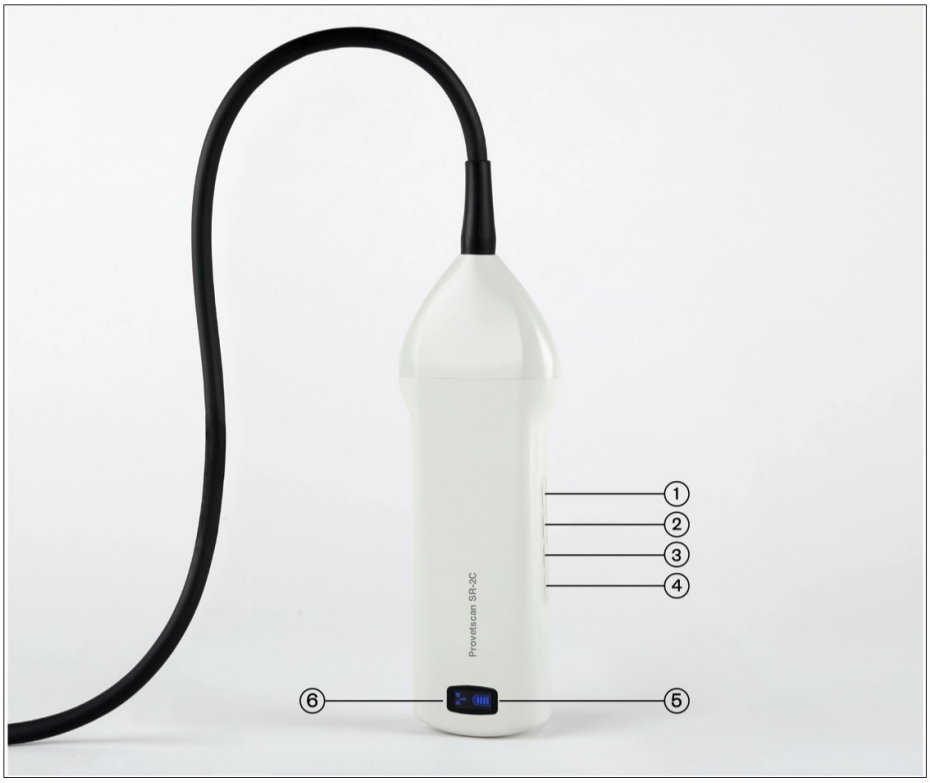
2.3 Connecting the probe

The WiFi connection and battery life indicators must be turned off before connecting the probe.

Press the (1) ON/OFF button. The battery life indicator (5) tells you how much batter you have left. This indicator is split into four levels.
Seconds after connecting the probe, the (6) WiFi connection indicator will blink, showing it is ready to be connected to the mobile device.

Press the (1) ON/OFF button for three seconds to turn the probe off. When the probe is turned off, the light-up indicators (5) and (6) will also be turned off.

Additionally, this WiFi probe has another 3 buttons: (2) to modify depth, (3) to lower gain and (4) to raise gain.



2.4 WiFi Connection

When the probe is waiting for a WiFi connection, go to iPad settings and search for the probe's SSID. The SSID is, for example, "CR-1A GVCJDA001." Connect the SSID with the password, which is the serial number engraved on the bottom of the probe. The password would be, for example, "CRPCJDA001."

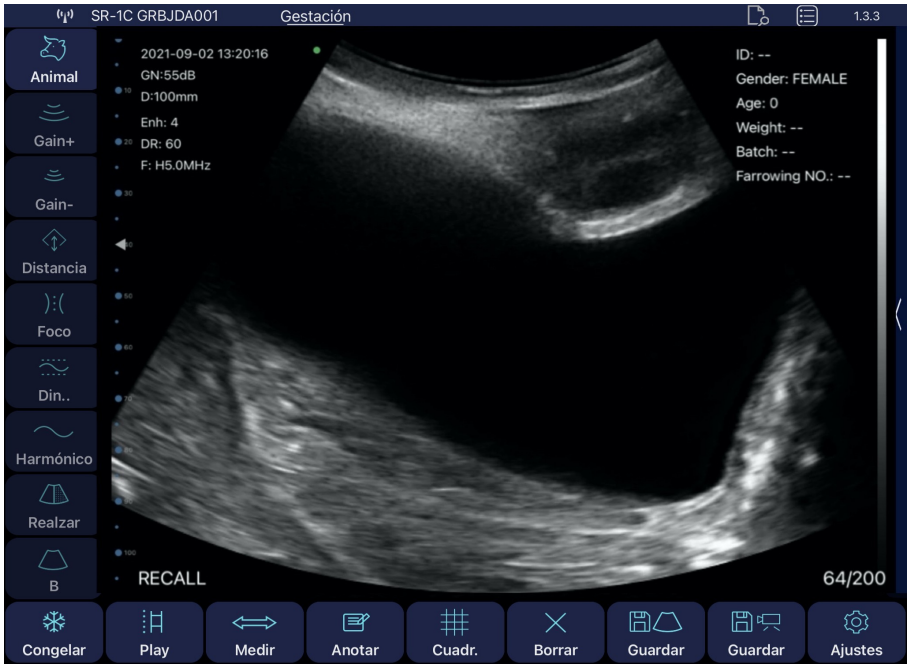
The password's letters must be input as small letters, not capital.

Once connected to the WiFi network, start up the VetUS application. When we begin working with the probe, the WiFi signal indicator will no longer blink the same way.

3. App functions

Once the probe is connected, start up the app and the main screen will appear.
No image is shown when you open the app for the first time.

3.1 Ultrasound scan

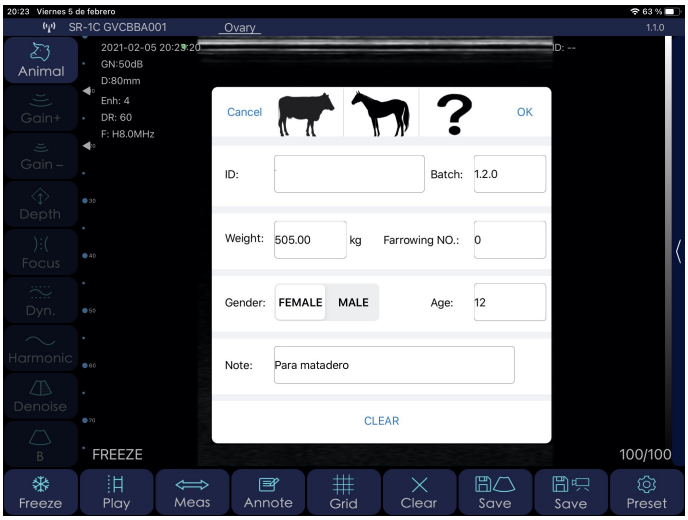


The connected probe's network is shown on the upper left.

Description of app buttons:

When you press the "Animal" button, a window pops up to enter the type of animal and the following fields:

When you press on the Animal image, three possibilities are displayed: bovine livestock, equine livestock and unspecified.

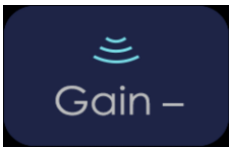


ID: ID number of animal with alphanumeric characters.
Batch: Batch number with alphanumeric characters.
Weight: Animal weight.
Farrowing No.: farrowing num. (not shown when Male is selected)
Gender: Select male or female
Age: Animal age
Note: To insert notes or diagnoses on the animal.

All this fields are recorded in the CSV file generated when you export the data stored in the application.

GAIN is the ability to modify the ultrasound's amplitude (magnitude of the ultrasound), changing the brightness of the image. General gain changes affect the entire image equally.

Raises scan gain up to 105 dB.

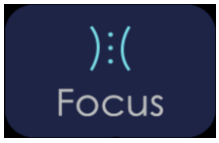


Lowers scan gain down to 30 dB.

Depth
You can work with greater or lesser depth. Press the following button.

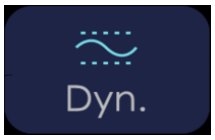
Selects the 4 zooms available: 100, 130, 160 y 190 mm.
You can also adjust this by swiping your finger in the middle of the screen, up or down.

Focus
This is the maximum concentration of lines inside the ultrasound beam. This means you must place the focus in the area of interest.



Adjusts the focus to obtain the best image, raising or lowering it on the screen.

Dinamic range
This process raises or reduces the difference between ultrasounds of greater or lesser amplitude. With the Dynamic Range, you vary the amplitude of the signal shown in grey scale. At a low setting, the image has greater contrast. When increased, the image is softened.



The value range goes from 40 to 110. Lower settings increase the image's contrast.

Frequency
You must select the suitable frequency for the examination. With greater frequency, there is lesser penetration, and vice-versa. With the Harmonic Image, the return signal not only includes the base frequency, but also the frequency matching its double. The ultrasound processes both signals separately, eliminating the basic frequency with its noise.

Changes the scan frequency from 3.5 to 5 MHz

Denoise
It's an algorithm to eliminate spotting, to soften the image of the organs and to make the edge of tissue softer. Lower settings increase image noise, and high settings reduce it.

Reducing image grain. Range of value from 0 to 3.

B Mode
Two-dimensional representation of the ultrasounds, shown as light-up dots with variable clarity, depending on frequency and depth.

Press this button to show the ultrasound options with modes BM, Colour, PDI and PW. More information in section 3.2.

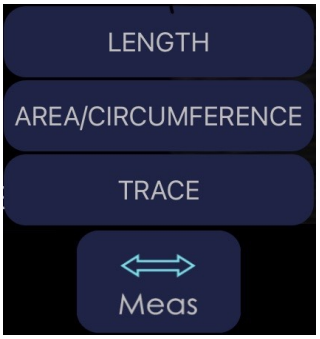
Freeze
Put the probe on stand-by by freezing the image to examine aspects more thoroughly. The probe's consumption is less than half of LIVE mode consumption.

Freeze and unfreeze (live) the image.

Play
This equipment permanently records a video sequence (Cine Loop) of the last 100, 200, 500 or 1000 frames. As new photograms are recorded, the previous ones are deleted. To change the Cine Loop's size, go to the settings button.

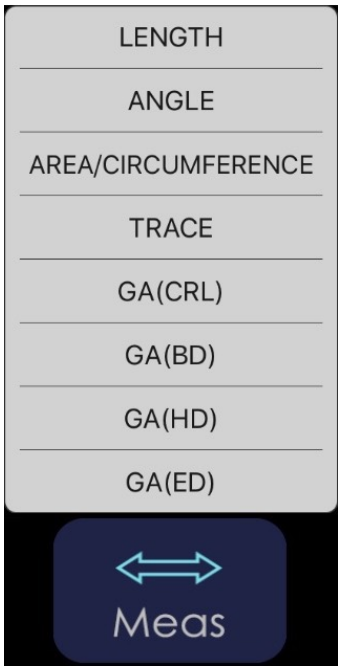
Once the image is frozen, this plays the saved Cine Loop.

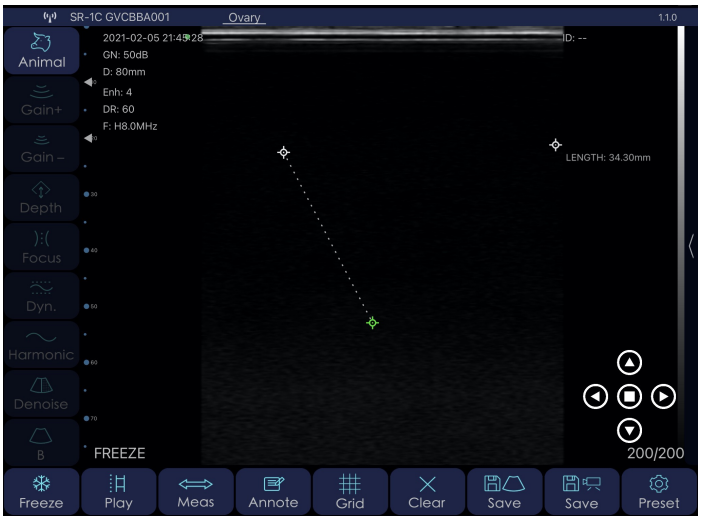
Measurements
You have three measurement modes: length, area/circumference, and contour line. Once the method is selected, take the measurement with your finger on the screen, placing the cursors where you wish to measure for length mode, or by drawing the desired area for area, circumference, and contour line modes.



Press this button to drop-down the menu that shows length, area/ circumference and contour line measurements, and measurements to calculate gestation if you selected bovine or equine livestock.

Gestation age calculation:
If you have selected bovine livestock, you make take the following measurements:





GA (CRL): Crown to Rump Length. This calculates the gestation age based on the distance from the crown of the head to the rump of the foetus.

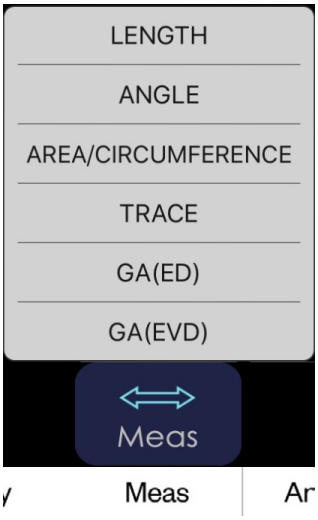
GA (BD): Body Diameter. Calculates the gestation age based on the maximum diameter of the fœtus' body/ thorax.

GA (HD): Head Diameter. Calculates the gestation age based on the maximum diameter of the fœtus' head.

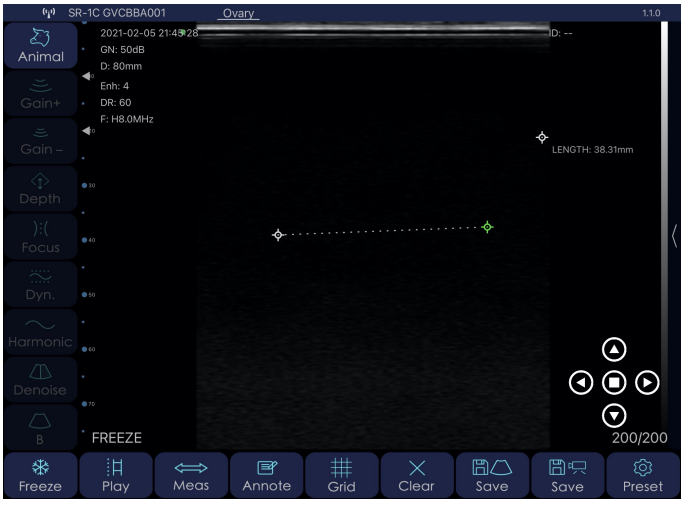
GA (ED): Eye Diameter. Calculates the gestation age based on the maximum diameter of the fœtus' eye.

If you have selected equine livestock, you make take the following measurements:

Note: once the gestation measurement has been taken down, the estimated delivery date (EDD) is automatically shown



GA (ED): Eye Diameter. Calculates the gestation age based on the maximum diameter of the fœtus' eye.



GA (EVD): Embryonic Vesicle Diameter. Calculates the gestation age based on the maximum diameter of the embryonic vesicle.

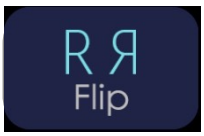
Annotations
You can make notes anywhere on the screen. You may input alphanumeric characters. If, after leaving a comment on the screen, you save the image, then the note will be included.

This creates a window at the location on the screen where you pressed with your finger, and the keyboard pops up to write.

Grid To have orientation of the measurements organs may have, the size of the foetus, or other structures, you can work with a grid superimposed on the screen.

Activates or deactivates the grid on the screen.

Change scan direction
In scan mode, press this button to change the scan direction.



A green dot on the upper right or left of the ultrasound image shows this. If the dot is to the right, it means the image will be viewed starting from the right as you insert the probe into the rectum. If the dot is on the left, it is the other way around.

Clear

Press this button to clear all measurements and annotations on the screen.

Save Image and diagnostic data
Once the image is frozen, you have saved the 100, 200, 500 or 1000 images in the Cine Loop that may be saved in the film roll. Swipe your fingers in the middle of the screen to the left or the right to select the image you wish to save.

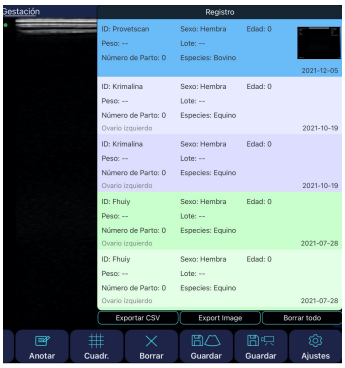
Save a screen shot of the image selected from the film roll.

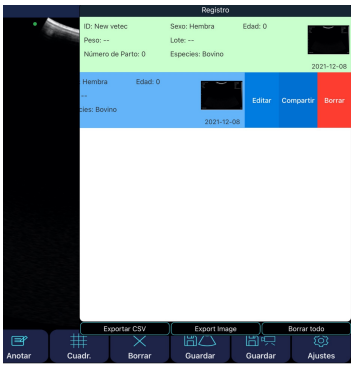
At the same time an image is saved, a window pops up showing the saved diagnostic data. This window automatically closes after about three seconds.

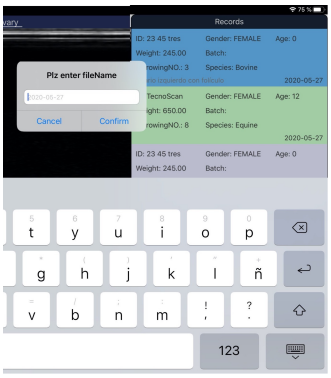
If you wish to see the table with all diagnostic data, press the button the upper-right part of the image:

An example of diagnostic data saved in the application's memory might be:

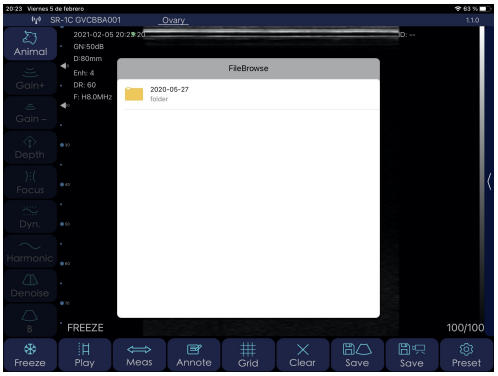
Once this table is displayed, you have the possibility of deleting all diagnostic data (RemoveAll), exporting these data (ExportFile) or save image (Export image). Swipping in saved data it can be edited, shared and erased. If you select "ExportFile," a new window pops up to name the CSV le generated, along with today's date:



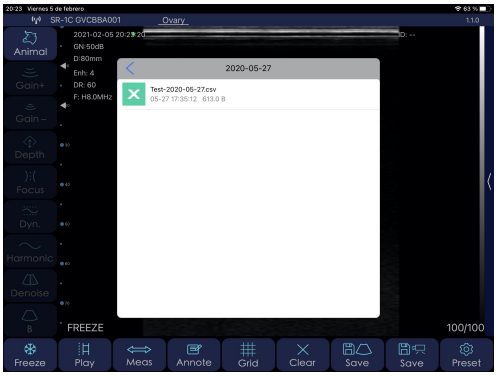




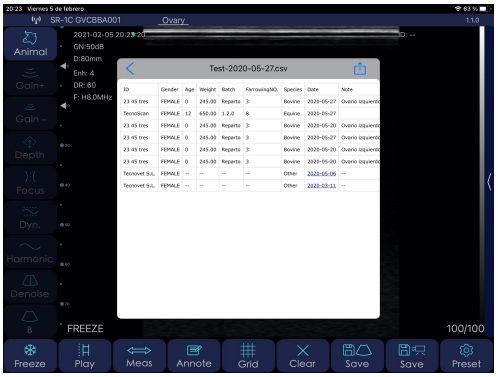
This archive will be included inside a folder with today's date.



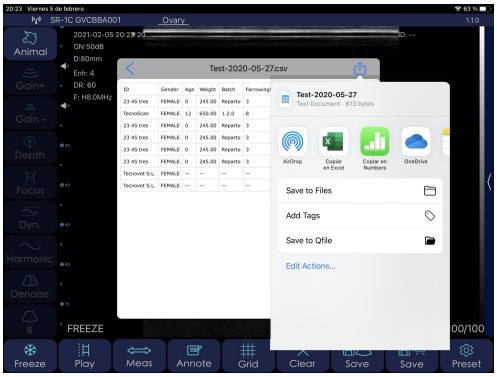
It is here inside this folder where you can find the CSV file. This file automatically opens with Excel, although you can also open it in Numbers.



You can preview the CSV file by pressing on the file icon.



You can now share this file with applications on your iPad and save them in these applications with the Files application:

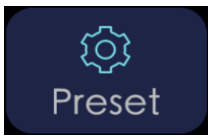


If you wish to access the saved folders holding the CSV files, press on the following icon, on the upper right-hand part of the screen:

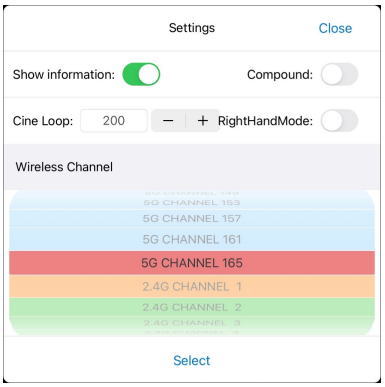
Save Video
When you freeze the image, like in the previous case, the Cine Loop stops recording, and the entire photogram sequence can be saved. Videos will last 10, 20, 50 or 100 seconds.

This saves in the Cine Loop you were storing until you pressed Freeze in the film roll.

Settings
Shows the settings you can adjust on the equipment.



Press this button for a pop-up window to modify the following parameters:



- Show information: shows or hides information on screen parameters.

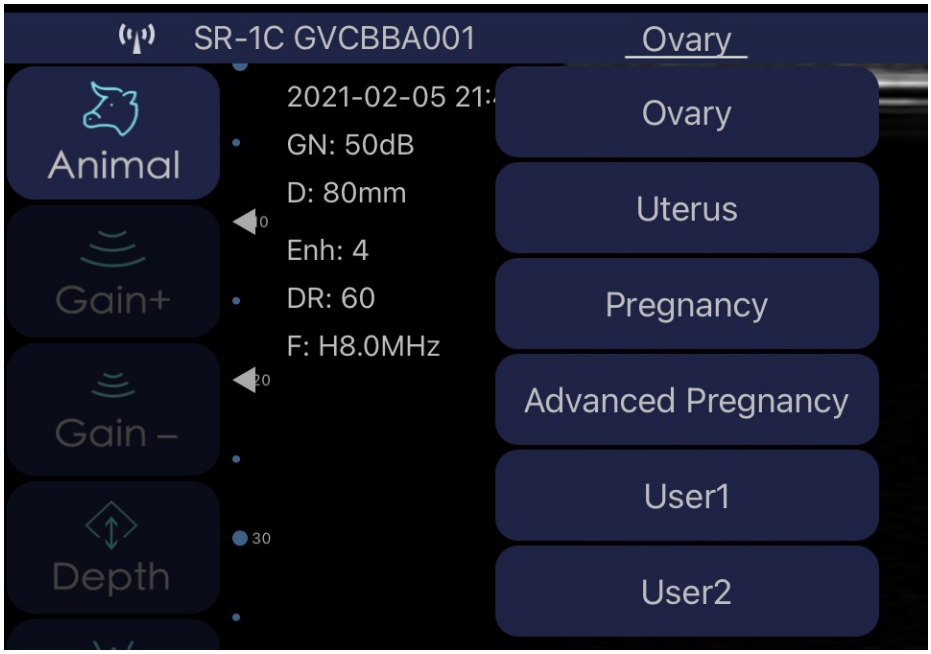
- RightHand: If you activate this, the buttons that are shown by default on the left will be shown on the right. This is more comfortable for users who conduct the examination with their left hand.

- Compound: Processes the image more so it appears softer, but the image is slower.

- Cine Loop: temporary recording made as you conduct the ultrasound. The last 100, 200, 500 or 1000 photograms will be saved.

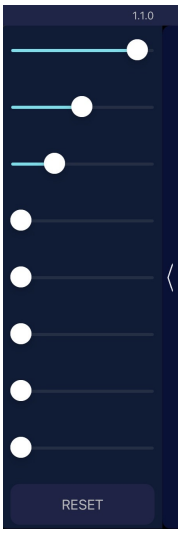
- Adjusting WiFi, 2.4 GHz or 5 GHz channels. In the event of conflict with other WiFi network channels nearby, the channel can be changed to prevent interference. If you change the channel, you will lose the probe password and you will need to enter it again. See point 2.4 of this manual.

In addition to these buttons, there is a drop-down menu on the upper left where you can select up to 6 pre-settings.



The first 4, **OVARY**, **UTERUS**, **PREGNANCY** and **ADVANCED PREGNANCY** are factory settings. Although you can modify them, every time you press one of them, you will return to the memorised values.

The next 2, **USER1** and **USER2**, can be adjusted by users. The last values right before closing the app are always memorised, so that the latest settings are shown when you return to work.



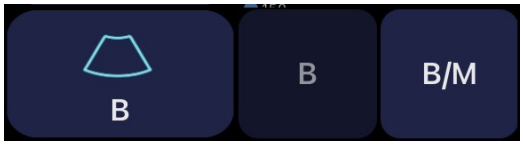
Finally, if you press the vertical bar on the right-hand side, you can drop down the 8 sections of the **TGC** to adjust gain as desired for each zone.

If you slide each one of the buttons to the right, you increase gain at that screen height. Sliding it to the left decreases gain. If you press **RESET**, you return the factory TGC settings.

Note: Only buttons lit up in white are available. On the lower right, you can see a number that shows the current image recorded in the Cine Loop (100/100). The user can swipe their finger in the middle of the screen to the left or the right to select the desired image. This means that any photogram, from 1/100 to 100/100, may be saved by pressing the button “Save image.”

The lower left of the screen will read “LIVE” when the probe is in motion or will show “FREEZE” when the image is frozen.

3.2 Special functions: Settings in BM mode



As explained in point 3.1, if you press the “B” button, you access the rest of the ultrasound machine’s special functions: BM, Colour, PDI and PW modes.

3.2.1 BM Mode

The M Mode shows the movement of all information collected along a line we place over the image. This provides for a graphic analysis of surfaces that are in movement, and to quantify them. This button combines the B (2D ultrasound) and M (in movement) modes. M signals are shown on the monitor’s horizontal axis.

4. Maintenance
4.1 Charging the probe

When the battery runs out, you must recharge it. You can do this with a wireless charger. Not included as part of the series is the loading platform. Connect its USB cable to it, and the mobile device charger.

When the charger is connected to the USB cable, the platform's LED light turns green.

We recommend using a 2A charger and the original cable for the wireless charging base.

When the battery is being charged, the indicator levels will blink until charging is complete. At this point, the four levels will be visible, without blinking. Charging the battery can take up to 6 hours.

The battery duration is 6 hours under constant operation, and 14 hours on stand-by. As such, if you are not examining between one animal and the other, we highly recommend freezing the image to save battery if you need to work for many hours throughout the day.

The iPad lasts around 9 hours, depending on ambient light. If there is much light, the iPad's brightness will turn up to offset it, leading to higher consumption.

4.2 Tablet resistance

To prevent the tablet from becoming dirty from dust, it's included a cover that it is also fall-resistant up to 1.2 m.

4.3 Cleaning

The probe must periodically be cleaned. The part of the probe that is inserted into the rectum has IP68 water- and dust-protection, meaning it resists dust and water, but the (beige) electronic part **cannot be submerged**. You may use a damp cloth or paper to clean it.

4.4 Storage

While storing the probe, we highly recommend that the temperature be no lower than 15°C. If the probe or the mobile device's temperature is lower, you must warm them before use.

Another recommendation: regarding battery charge, if the probe and the tablet will not be used for a long period, we recommend storing them with a full charge.

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