

## Declaration

Thank you for purchasing All-Digital Veterinary Ultrasound Diagnostic System.

Before using the product, please read the contents of this instruction manual carefully so as to use the product correctly.

After reading, please keep the manual properly so that you can refer to it at any time.

- Name: All-Digital Veterinary Ultrasound Diagnostic System
- Model: VU1
- Composition: Consists of host, adapter and probe
- Range of Application: The equipment is suitable for inspection of animal viscera and reproductive process
- Manufacturer: Wuhan Zoncare Bio-medical Electronics Co., Ltd
- Registered Address: #380, High-tech 2<sup>nd</sup> road, Eastlake high-tech district, Wuhan, Hubei, P. R. China
- Production Address: #380, High-tech 2<sup>nd</sup> road, Eastlake high-tech district, Wuhan, Hubei, P. R. China
- Production Date: See the label
- Operating Life: 10 years

Issuing date of this user manual: 2019.09.17    Version: 1.0

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## Statement

ZONCARE has the final interpretation of this manual.

ZONCARE is responsible for safety, reliability and performance of this product only if all of the following requirements are met:

- Assembly operations, expansion, re-adjustment, improvement and repair are carried out by professionals recognized by ZONCARE;
- All repairs related to the replacement parts and supporting the use of accessories, supplies are ZONCARE original or approved by ZONCARE;
- Related electrical equipment is in line with national standards and the requirements of this manual;
- The operation of the product is carried out according to this instruction manual.

## Warranty and Repair Service

The warranty period of the purchased product is subject to the sales contract.

Consumables refer to the disposable consumable material that needs to be replaced after each use or the vulnerable material that is replaced regularly. There is no warranty for consumables.

Warranty period counts from the installed date which is filled on the *Warranty Card* accompanying the product. The *Warranty Card* is the certificate to calculate the warranty period. In order to maintain your rights and interests, please fill out the warranty card after equipment installation, and hand over its duplicate to the installer or mail back to ZONCARE customer service department.

When in the warranty period, the product purchased from ZONCARE is provided with free warranty service. When beyond the warranty period, our sold products are provided with repair service under the condition that reasonable labor, spare parts and transportation costs are charged by us. But be attention, when the product, even if in the warranty period, is damaged for the following reasons, ZONCARE will provide fee repair service, then you need to pay the repair and spare parts costs:

- Man-made damage
- Improper use

- The grid voltage exceeds the scope of the provisions of the product
- Irresistible natural disasters
- The product is replaced with the parts, accessories and consumables unapproved by ZONCARE or is maintained by the personnel unauthorized by ZONCARE.
- Other faults caused not by product itself.

After the expiration of the warranty period, ZONCARE can continue to provide fee repair service. If you do not pay or delay payment of the cost of repair services, ZONCARE will temporarily suspend the service until it's paid.

## After-sale Service Information

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**Warning: The ultrasound device should be operated by, or under the guidance of professional clinicians. Any unauthorized or untrained personnel shall not carry out any operations.**

## Important Information

After purchasing this product, the customer has full responsibility for the maintenance and management of the product.

Only medical personnel with a professional qualification certificate can use the system.

Quality guarantee does not contain the following content even the product is still in warranty period.

1. Damage or loss of the system purchased, not from our company, or from other unauthorized dealers and agents.
2. Damage or loss of system caused by errors or man-made reasons;
3. Conditions of using and operating the system do not meet the requirements, such as intensive fluctuation or insufficient supply of the grid power, or improper installation etc.
4. Damage or loss caused by irresistible natural disasters or other social factors;
5. It's prohibited to disassembly and change such hardware modules as this system's circuits and electronic devices, and associated software modules, etc;

6. Under no circumstances, shall our company be responsible for the problems, losses or damages caused by installation or re-installation, alteration or repair of this system by persons unauthorized by our company.
7. This system is intended to provide associated diagnosis data needed clinically for doctors or hospitals. Therefore, it's not our company but the doctors who shall assume associated responsibilities for the diagnosing process.
8. The doctor who operates this system should back up important data to external storage media. For loss of data stored within the system caused by faulty operation or abnormal cases, our company will not assume any responsibility;
9. This user manual contains the foreseeable potential hazard warnings. At any time, stay high alert to those hazards not instructed in this user manual. For loss and damage caused by negligence or ignorance of the precautions specified in this user manual, our company will not assume any responsibility;
10. This user manual must be handed over when the system administrator is changed.

## **Preface**

### **Introduction**

The product's usage, function and operation are described in details in this user manual. Before use, please carefully read and understand the contents in this user manual to guarantee proper use of this product, and safety of the operator and the animal.

This user manual introduces this product in accordance with the most complete configuration. However, parts of its contents may be not applicable for your purchase. For any questions, please contact our company.

Based on the necessity of improving the parts and the equipment's performance and reliability, some modifications may be made to the equipment (both hardware and software). Then associated literal contents will be modified and added. But there might be some descriptive inconformity, thanks for your kind understanding.

Put this manual nearby the device so that you can get it in time.

### **Application**

This manual applies for professional clinical medical personnel, who must have knowledge and working experiences in relevant medical procedure, practice and terms.

## Illustrations

All illustrations provided in this manual are for reference only, the settings or data may be not entirely consistent with what you see from actual display of the product.



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# 1 Safety Instruction

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## 1.1 Safety Classification

- According to the type of electric shock proof:  
Class I Internal power equipment
- According to the degree of electric shock proof:  
Type B applied part.
- According to protection rating of harmful liquid ingress:  
Host: IPX0 (Unprotected)  
Probe: IPX7 (Protection against short-time ingress)
- According to the safety degree of using the equipment in the presence of ignitable anesthesia gas mixed with the air (or oxygen, nitrous oxide): Not suitable.
- According to working mode:  
Continuous operation
- According to the way of installing and using the equipment:  
Portable equipment

## 1.2 Symbol Definition

In this user manual, symbols like “ **Danger**”, “ **Warning**”, “ **Caution**” and “**Notice**” are used to indicate the associated safety and other important matters. They are specifically defined as follows. Please carefully understand and remember their definitions before reading this user manual.

| Symbols and Vocabulary                                                                             | Definitions                                                                                                            |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|  <b>Danger</b>  | This symbol indicates that urgent danger will happen. If not avoided, it would lead to casualties or serious injuries. |
|  <b>Warning</b> | This symbol indicates that potential danger may happen. If not avoided, it may lead to casualties or serious injuries. |

|                                                                                                  |                                                                                                                            |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|  <b>Caution</b> | <b>This symbol indicates that potential danger might happen. If not avoid, it could lead to slight or medium injuries.</b> |
| Notice                                                                                           | This symbol emphasizes important notices, and provides instructions or explanations to make better use of the product.     |

### 1.3 Safety Symbols

| Symbol                                                                            | Detailed Instruction                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>“Caution” indicates the matters that should be paid attention to. Before using this system, please carefully read associated contents in this user manual.</p> <p>It indicates that reference to associated contents in this user manual could avoid safety accidents.</p> |

### 1.4 Classification of Electrical safety

1. IEC 60601-1:2005/A1:2012 Medical electrical equipment - Part 1: General requirements for basic safety and essential performance.
2. IEC 60601-1-2:2014 General requirements for basic safety and essential performance-Collateral standard: Electromagnetic compatibility-Requirements and tests.
3. EN 62304:2006/AC:2008 Medical device software - Software life-cycle processes.
4. IEC 60601-2-37:2007+AMD1:2015 Medical electrical equipment-Part 2-37: Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
5. ISO10993-1:2009/AC:2010 Biological evaluation of medical devices –part 1:Guidance on Selection of Tests
6. EN ISO 13485:2016 Medical devices - Quality management systems - Requirements for regulatory purposes
7. EN ISO14971:2012 Medical devices-Application of risk management to medical devices
8. EN1041:2008 Information supplied by the manufacturer with medical devices.
9. EN ISO 15223-1:2016 Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied
10. EN 62366:2008 Medical devices - Application of usability engineering to medical devices
11. EN 60601-1-6:2010 Medical electrical equipment - Part 1-6: General requirements for basic safety and essential performance - Collateral standard: Usability

*Provisions on the Management of Instructions and Labels of Medical Devices (CFDA Notice No.6)*

### 1.5 Safety Overview

Please carefully read the following contents before using this equipment to ensure the safety of users and patients. In this user manual, instructions of associated warnings mean that, if not strictly followed, it may cause physical injuries or even life threat to users and patients.

The user must observe the following items

1. Don't attempt performing any modification on the equipment; if it's necessary to do so, please contact us.
2. This equipment is completely debugged when delivery. Please do not adjust any fixed adjustable parts.
3. This equipment is cut off power supply network by plugging and unplugging. If abnormality occurs while using this equipment, please immediately cut off the power and contact us.
4. Power supply of this equipment must be well grounded. Ground wires should not be removed or dismantled arbitrarily.
5. When this equipment must be connected electronically or mechanically with other devices, whose signal input and output must meet the requirements of the standard IEC 60601. Besides, all safety indexes of this system's leakage current should be rechecked.
6. This equipment is not provided with precautions for high-frequency surgical equipment. Please do not use it as possible.
7. Only the personnel authorized by our company can install this equipment. Do not install it yourself.
8. Only the engineers authorized by our company can maintain this equipment.
9. Users must be trained and qualified physicians or professionals.
10. This equipment cannot be used in flammable environments, which may cause an explosion.
11. All components of this system (including host, probe, and adapter) are suitable for use in animal environment.
12. While cleaning, please cut off the power supply to prevent water and other liquids from dropping into this equipment.
13. In order to ensure the safety of the patient, a same part of whose body cannot be scanned into image continuously for a long time.
14. This equipment should be used with ultrasound coupling gel while performing ultrasonic scanning. Though problems like bio-compatibility is not identified, still qualified ultrasound coupling gel conforming to associated standards must be used for safety insurance.
15. When this equipment is discarded as useless, please notify us.

## **1.6 Safety Warnings**

In order to ensure the safety of animals and operators, please strictly observe the following safety precautions .



**Danger:** Never use the system in the presence of flammable gases (such as anesthetic gases, oxygen, hydrogen, etc.) or liquids (such as ethanol, etc.). Otherwise it may cause an explosion.



**Warning:**

1. The power plugs of this equipment and its connected peripherals must be connected to a wall outlet. Besides the outlet must meet the requirements on the rated power signpost. Using the adapter or multi-functional outlet may affect the grounding, thus the leakage current may exceed the safe limits.
2. The power plug of the equipment must be connected to the grounding wire before inserting into the outlet. In order to avoid electric shock, the plug must be pulled out of the outlet before unplugging the grounding wire.
3. While the system is working, please make sure that its grounding terminal is connected to the earth. Besides, this equipment must be power off when it is connected to the ground cables. Otherwise it could lead to an electric shock.
4. Please follow the proper ways of connecting the power with the earth in this user manual, or there will be electric shock. Don't connect the ground wire to any gas pipe or water pipe, or it will lead to poor grounding or explosion risk
5. Before cleaning this machine, be sure to unplug the power cord, or it may result in electric shock.
6. This machine does not consist of any waterproof device. Do not use this equipment where water might enter into it. Do not spill any liquid onto or into the machine, otherwise there will be a risk of electric shock. If liquid is accidentally spilled onto the machine, please shut it down immediately and unplug the power. Contact us or our authorized customer service personnel if necessary.
7. Please use the probe (s) properly and carefully. If the probe's surface which contacts the animal is scratched, please stop using the probe immediately to avoid its mechanical damage. And also contact us or our authorized customer service personnel. Using a scratched probe will incur the danger of electric shock.
8. Such live parts of this equipment or other equipment as all input and output signal ports are forbidden to contact with the animals. If this equipment or other equipment breaks down, there will be electric shock danger to the animals.
9. Use the probe provided by us only, otherwise it will cause damage to the host and probe, and even cause accidents such as fire.
10. No knocking the probe. Using a faulty probe may result in electrical shock.

- 11. Do not open the shell or panel, otherwise it will cause short circuit or electric shock.**
- 12. Do not use this equipment simultaneously with electronic devices such as HF (high frequency) electrotome, HF therapeutic equipment or defibrillators etc. Otherwise it might cause electric shock to animals.**
- 13. Precautions during transport: hold the handle when you need to move the unit.**
- 14. All simulated, digital products connected with this ultrasound system must be certified by IEC standards.**



#### **Caution**

##### **1. Notices for clinical exam techniques**

- This device may only be operated by professionally qualified staff.
- The operator should not simultaneously contact the animal and the printer.
- Techniques of clinical exams are not described in this manual. Therefore users shall perform the exam properly on the basis of professional training knowledge and clinical experience.

##### **2. System exceptions caused by radio waves:**

- If this medical electronic system is used nearby the radio transmitting equipment, its normal operation may be interfered. Devices which could generate radio waves are forbidden to be carried or used in the room of installing this system, such as mobile phones, radio transceivers and remote control toys.
- If the user is carrying a device that may generate radio waves in the vicinity of this system, it is necessary to immediately shut down the device to ensure that the system is working properly.

##### **3. Notices for installing and moving this equipment:**

- Please ensure that this machine is mounted horizontally during installation.
- Do not place anything on the monitor for it may drop and cause injury.
- Before moving the equipment, make sure that peripherals are fixed securely. Otherwise, peripherals may topple and fall, thus causing injury.

##### **4. Never apply too much vibration on this equipment (while moving it), or mechanical parts will be damaged.**

##### **5. Always keep this equipment dry. Avoid moving it quickly from a cold place to a warm place. Otherwise there will be condensation or water droplets, thus causing a short circuit risk.**

##### **6. If the circuit protector works, it indicates this equipment or peripherals break down. Please contact our company or the customer service personnel authorized by our company. Do not repair it by yourself.**

- 7. Normal inspection of the veterinary ultrasound diagnostic system will not have the risk of burns, even when the probe's surface temperature exceeds the animal's body temperature with different ambient temperature and inspection modes.  
In order to avoid burning, do not place the probe at the same position of the animal for a long time. Shorten the inspection time as possible when it's appropriate for diagnosis.**
- 8. This equipment and its accessories are not disinfected and sterilized when delivery. The probe and puncture trestle should be disinfected and sterilized according to the methods provided in this user manual before use. After disinfection and sterilization, chemical reagent or gas must be eliminated completely. Otherwise, residues will damage the accessories and even injury human body.**
- 9. It is forbidden to directly plug or unplug the system and its accessories (printer). Otherwise it will lead to system damage.**
- 10. It's forbidden to power off the system in the process of printing, storing and invoking the data, otherwise it will lead to data loss.**
- 11. In the process of operation, improper power failure may lead to data damage in hard disk or system failure.**
- 12. Please carefully read the section *Using Principles of Sound Output* before the ultrasound diagnostic system is used to perform clinical exams.**

**Cautions:**

1. It's forbidden to use this system in strong electric or magnetic fields (such as transformers). Otherwise it will cause adverse effects on the monitor.
2. It's forbidden to use this system near high frequency devices. Otherwise it will cause adverse effects on the performance and even failure.
3. To avoid damage to this system, it's forbidden to use this system in the occasions below:
  - 1) In a place with direct sunlight;
  - 2) In a place where temperature fluctuates dramatically;
  - 3) In a dusty place;
  - 4) In a place where the system is prone to vibrate;
  - 5) In a place nearby the heat source;
  - 6) In a place with high humidity
4. If this machine is power off, please wait for five minutes before restarting it. Otherwise the system may fail.
5. Prior to plugging or unplugging the probe, the system must be power off or the image must be frozen. Otherwise, it may result in system or probe failure.

6. After use, the probe should be thoroughly cleaned to eliminate the coupling gel on its surface. Otherwise, water in the coupling gel will invade into the sound lens, which will cause undesirable effects on the probe's performance and safety.
7. The user can record the registration data (such as the hospital, animal information, etc.). For the data's security, be sure to back up the information in external storage media. Because data stored within this system may get lost due to abnormal operation or failure.
8. Avoid applying force on the console (body leans on), or it may damage this machine.
9. Using this system in a narrow and small room may cause indoor temperature increase. Therefore the room must be kept well-ventilated.
10. When this system or any accessory needs to be discarded, please contact our company or the customer-service personnel authorized by our company. Don't maintain this system without consulting our company. Otherwise our company will assume no responsibility for any damage caused by disobeying this provision.
11. With this machine works longer, its electrical and mechanical safety performance will degrade (such as producing leakage currents or mechanical parts deformation and wear), and the sensitivity and accuracy of its image will get worse as well. In order to ensure its normal performance, the equipment must be inspected regularly.
12. After the battery in this system runs out of power, it will cause confusion to the time clock in the system. Then, please contact the customer service department of our company for battery replacement.

## 2 Overview

---

### 2.1 Scope of Application

The equipment is suitable for inspection of animal viscera and reproductive process.

### 2.2 Contraindications

No special contraindications.

### 2.3 Product Composition

The product consists of the host, adapter and probe(s).

### 2.4 Specification Parameters

#### 2.4.1 Power Conditions

Voltage AC 100V~240V

Frequency 50Hz/60Hz

#### 2.4.2 Ambient Conditions

|                      | Operation environment | Storage and transport environment |
|----------------------|-----------------------|-----------------------------------|
| Ambient temperature  | 5°C ~ +40°C           | -20°C ~ + 55°C                    |
| Relative humidity    | 25% ~ 85%             | 10% ~ 95%                         |
| Atmospheric pressure | 700hPa ~ 1060hPa      | 500hPa ~ 1060hPa                  |



**Warning: Do not use or operate this equipment beyond the specified ambient conditions.**

### 2.5 Software Version

The software version of the equipment system is V1

### 2.6 Network Security

#### 2.6.1 Running environment

| NO. | Module                        | Specific                                                    |
|-----|-------------------------------|-------------------------------------------------------------|
| 1   | Power                         | Support DC/DC modules, support power management             |
| 2   | Control panel                 | Serial port control panel supporting communication protocol |
| 3   | Ultrasonic system Core module | system module                                               |
| 4   | Monitor                       | Medical color LCD 256 gray scale                            |

### 2.6.2 software environment

| No. | Module                           | Specific                 |
|-----|----------------------------------|--------------------------|
| 1   | Development Platform             | ISE 14.7(Xilinx Company) |
| 2   | Programming Language             | Verilog, VHDL            |
| 3   | The Main IP Core                 | PLL , LVDS , FFT , FIFO  |
| 4   | Hardware Communication Interface | RS232、USB、RGB888         |

## 2.7 System Configuration

### 2.7.1 Standard Configuration

- System host (including adapter)
- Probe (refer to *Packing list*)
- Accessories (refer to *Packing list*)

### 2.7.2 Optional accessories

#### ■ **Probe**

*Veterinary rectal probe6L64A vet*

*Veterinary micro-convex probe6C15A vet*

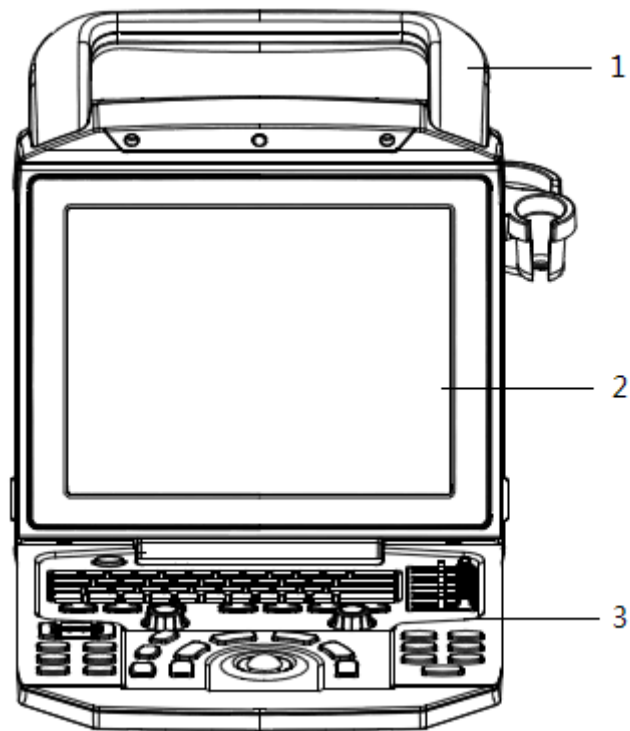
*Veterinary convex probe3C50A vet*

*Veterinary linear probe7L40A vet*

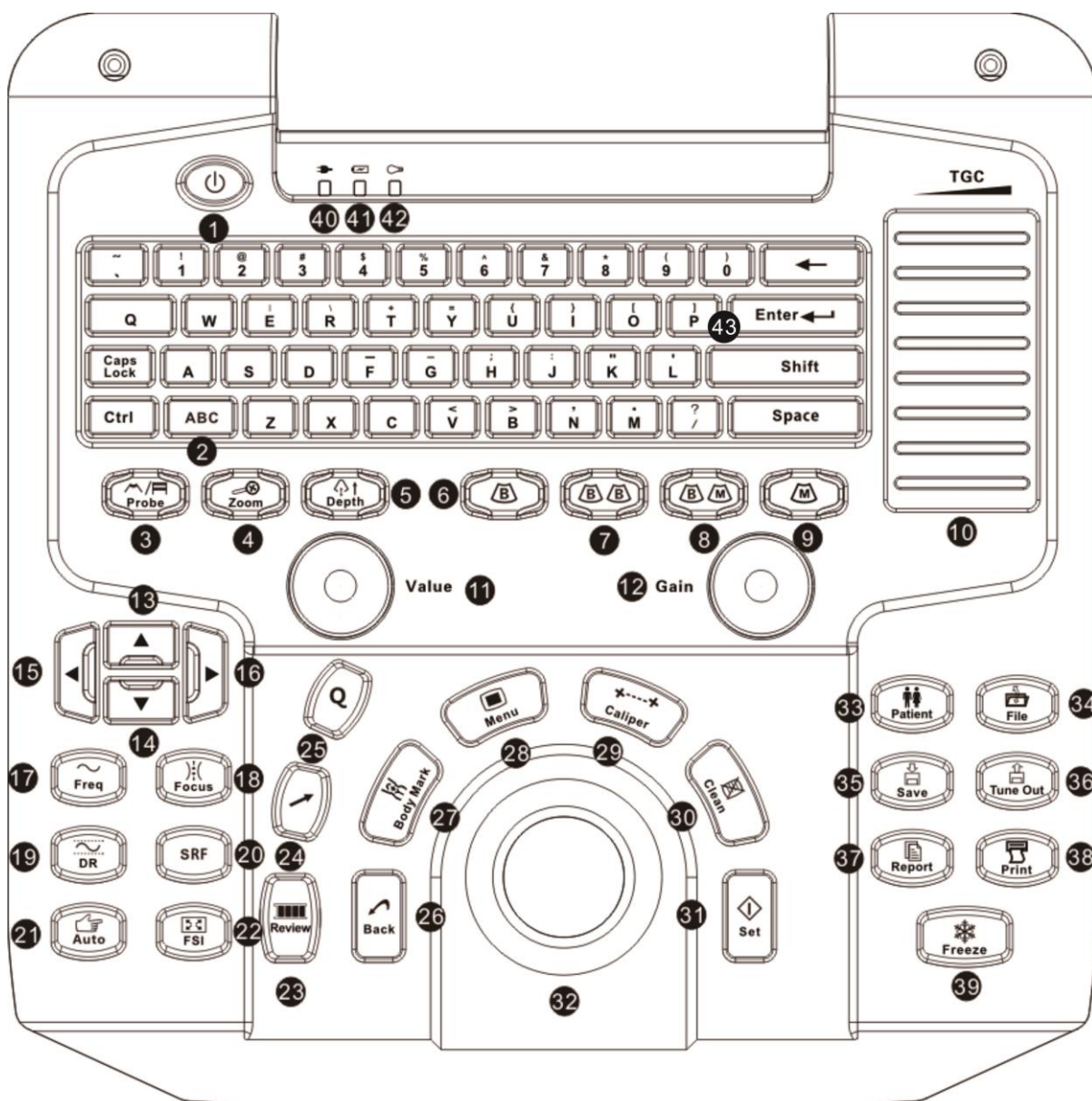
#### ■ **lithium battery**

## 2.8 Introduction of Each System Part

### 2.8.1 Front View



1. Handle: Move the equipment with the handle.
2. Monitor: Display ultrasound image and each application module.
3. Console: Used for control operations such as text annotation, report edit and ultrasound application (for more instructions, see the table below)



| No. | Button | Description | Function                                                                                                                |
|-----|--------|-------------|-------------------------------------------------------------------------------------------------------------------------|
| 1   |        | Enter/Exit  | Enter/Exit Ultrasound application program                                                                               |
| 2   | ABC    | Annotation  | Enter character annotation status                                                                                       |
| 3   | Probe  | Probe       | Switch probe(s)                                                                                                         |
| 4   | Zoom   | Enlarge     | Composite key ;<br>Press <b>Zoom</b> , and turn <b>Value</b> knob to enlarge the image.                                 |
| 5   | Depth  | Depth       | Composite key ;<br>Press <b>Depth</b> , and turn <b>Value</b> knob to adjust the depth.                                 |
| 6   | B      | /           | Press <b>B</b> to activate B mode<br>In B mode, press <b>B</b> once, and turn <b>Value</b> knob to enter <b>4B</b> mode |
| 7   | BB     | /           | Activate BB mode                                                                                                        |

|    |                                                                                     |                         |                                                                                                                                |
|----|-------------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 8  | BM                                                                                  | /                       | Activate B/M mode                                                                                                              |
| 9  | M                                                                                   | /                       | Activate M mode                                                                                                                |
| 10 | TGC                                                                                 | /                       | Value adjustment                                                                                                               |
| 11 | Value                                                                               | Value adjustment        | Composite key ;<br>Adjust corresponding parameters according to selected operation.                                            |
| 12 | Gain                                                                                | Gain                    | Turn the knob to adjust the gain of the image.                                                                                 |
| 13 | ▲                                                                                   | Move Up                 | Move cursor upward, measuring ruler, etc.                                                                                      |
| 14 | ▼                                                                                   | Move Down               | Move cursor down, measuring ruler, etc.                                                                                        |
| 15 | ◀                                                                                   | Move Left               | Move cursor, measuring ruler, etc to the left.                                                                                 |
| 16 | ▶                                                                                   | Move Right              | Move cursor, measuring ruler, etc to the right.                                                                                |
| 17 | Freq                                                                                | Frequency               | Conversion of probe frequency                                                                                                  |
| 18 | Focus                                                                               | Focus position          | Composite key:<br>Press this key and turn <b>Value</b> knob to move the focus.                                                 |
| 19 | DR                                                                                  | Dynamic range           | Composite key:<br>Press this key and turn <b>Value</b> knob to change DR value.                                                |
| 20 | SRF                                                                                 | Speckle Reduce Function | Composite key:<br>Press this key and turn <b>Value</b> knob to change SRF value.                                               |
| 21 | Auto                                                                                | Image optimization      | One key optimization                                                                                                           |
| 22 | FSI                                                                                 | Full Screen             | Enter <b>Full Screen Image(FSI)</b> Display                                                                                    |
| 23 | Review                                                                              | Cine loop               | Images can be reviewed after cine loop is activated.                                                                           |
| 24 |  | arrows                  | Enter arrow annotation status                                                                                                  |
| 25 | Q                                                                                   | Q guide                 | Q guide: this key makes it easier for the user to operate this exam system and quicker to eliminate the problems in operation. |
| 26 | Back                                                                                | Back                    | Return to previous step or delete previous item.                                                                               |
| 27 | Body Mark                                                                           | Subjects icon           | Enter subjects icon                                                                                                            |
| 28 | Menu                                                                                | Menu                    | Display the menu                                                                                                               |
| 29 | Caliper                                                                             | measurement             | Run caliper function                                                                                                           |
| 30 | Clean                                                                               | Clean                   | Clean annotations or calipers on the screen.                                                                                   |
| 31 | Set                                                                                 | Confirm                 | Run confirm function                                                                                                           |
| 32 | /                                                                                   | Trackball               | Roll to change the position of cursor                                                                                          |

|    |          |                           |                                                                                               |
|----|----------|---------------------------|-----------------------------------------------------------------------------------------------|
| 33 | Patient  | animal Info.              | Enter animal t information interface                                                          |
| 34 | File     | Image manage              | Enter file management                                                                         |
| 35 | Save     | Image Saving              | Save the image to U disk, or Local                                                            |
| 36 | Tune Out | Tune Out Image            | Browse the images saved to U disk, or Local.                                                  |
| 37 | Report   | Report                    | Enter the current animal report editing interface                                             |
| 38 | Print    | Print                     | Print image and report                                                                        |
| 39 | Freeze   | Freeze or defreeze images | 1. Freeze/defreeze current image<br>2. Activate cine-memory function when the image is frozen |
| 40 | /        | Indicator light           | Working light                                                                                 |
| 41 | /        | Indicator light           | Battery Charge light                                                                          |
| 42 | /        | Indicator light           | Power Warning light                                                                           |
| 43 | P        | /                         | Enter PW mode                                                                                 |

Cautions: Among the function keys,  key needs special attention.

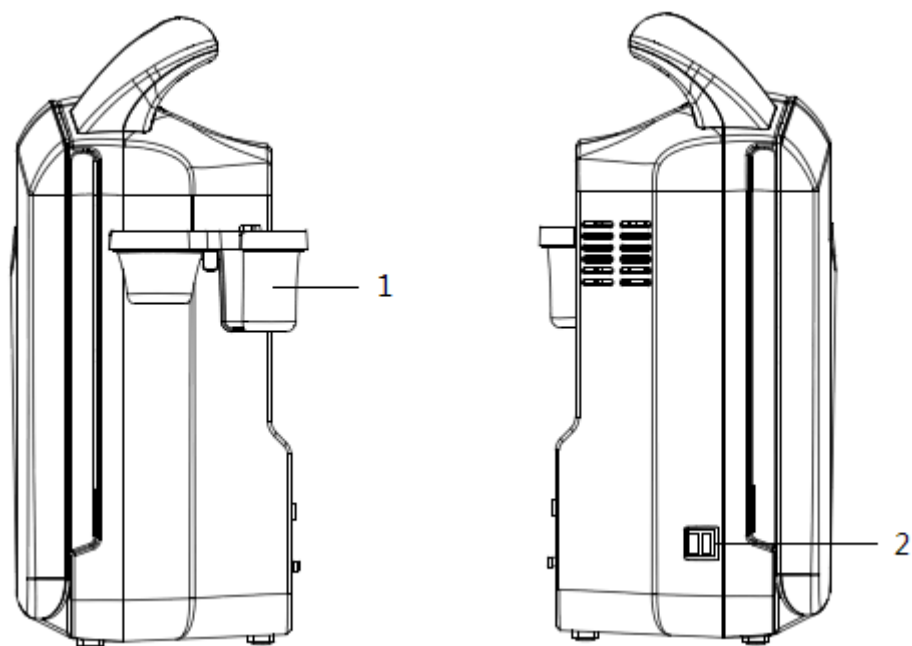
1. Once the key pressed, ultrasound system will exit, which needs about 10 second to save data. Please turn off the power when the working light is off.
2. If the system does not prompt to **Power Off** a long time after  key is pressed, force it to power off (if this occasion occurs constantly and frequently, please turn off the power, and contact our company or our authorized service personnel).
3. Please keep the records of abnormal power off. People who provide customer services and technical supports will need the records for maintaining the damaged equipment.



**Warning :** Improper power off may result in system booting or running slowly;

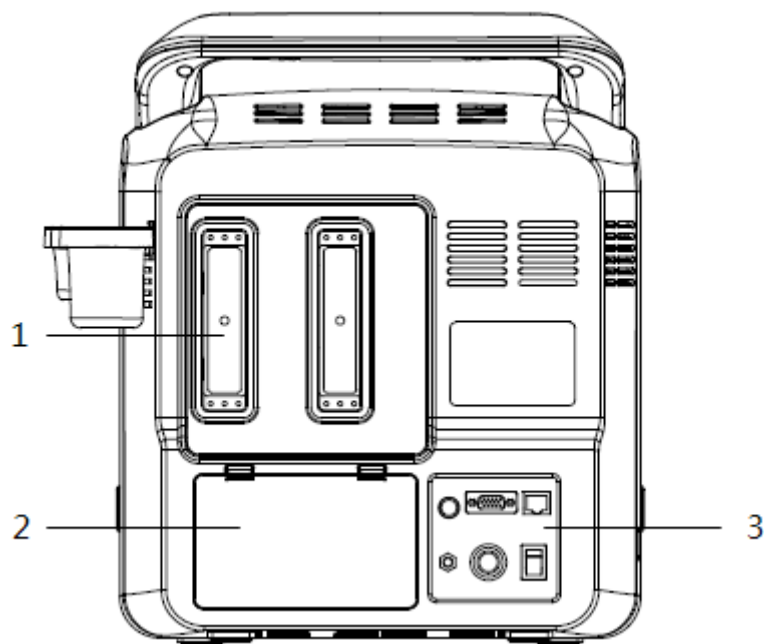
Frequent abnormal power off may cause damage or other abnormal faults to the ultrasound equipment

## 2.8.2 Lateral View

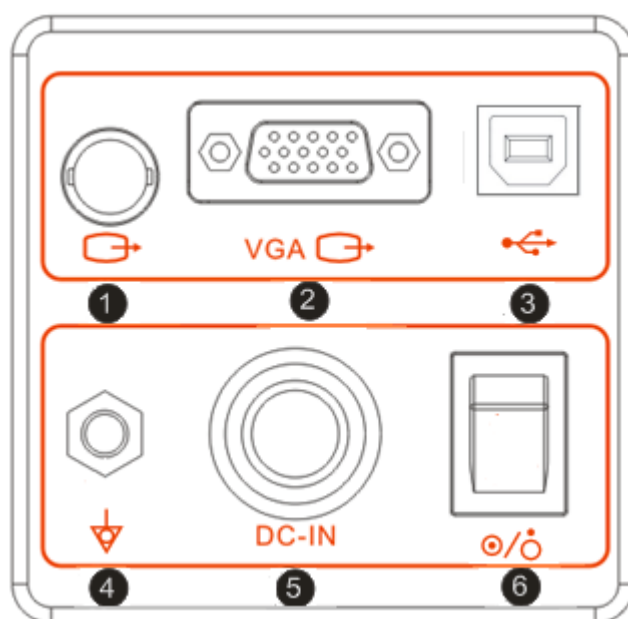


1. Probe Holder: Put the probe inside it when you don't use the probe.
2. USB (type A): USB external port

### 2.8.3 Back View



1. Probe port: Where the applied part of the probe is connected.
2. Battery compartment lid: For fixing the battery.
3. Port board: Electric input, output and video ports (for more instructions, see the table below)



| No. | Name          | Function                                                                        |
|-----|---------------|---------------------------------------------------------------------------------|
| 1   | Video         | Video signal output , used to connect video printers and ultrasound workstation |
| 2   | VGA port      | Connect external monitor                                                        |
| 3   | USB(B type)   | Connect to computer or printer                                                  |
| 4   | Equipotential | Balance the protective grounding potential                                      |
| 5   | DC input      | Input voltage                                                                   |
| 6   | Power switch  | Turn on/off the equipment power                                                 |

## 2.9 Instructions of Symbols and Identifiers

Following symbols and identifiers may appear on the equipment, please see their definitions in the table below.

| Symbol | Definition                                                                                                                                                                              |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | CAUTION indicates the matters which shall be paid attention to so as to avoid safety accidents. Be sure to read relevant contents in this manual before using this ultrasound system. . |
|        | Dangerous Voltage                                                                                                                                                                       |
|        | Equipotential                                                                                                                                                                           |
|        | On/ Off(used in only one part of the equipment)                                                                                                                                         |

|                                                                                     |                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | USB port                                                                                                                                                                                                                                                                                                                                    |
|    | Output video signal                                                                                                                                                                                                                                                                                                                         |
|    | Serial port                                                                                                                                                                                                                                                                                                                                 |
|    | Name and address of the manufacturer                                                                                                                                                                                                                                                                                                        |
|    | Manufacturing date                                                                                                                                                                                                                                                                                                                          |
|    | Serial number                                                                                                                                                                                                                                                                                                                               |
|    | Lot code                                                                                                                                                                                                                                                                                                                                    |
|    | <b>Consult Instructions for Use</b><br>Consult the user manual                                                                                                                                                                                                                                                                              |
|   | Indoor use                                                                                                                                                                                                                                                                                                                                  |
|  | Environment-friendly use period                                                                                                                                                                                                                                                                                                             |
|  | Waste Electrical & Electronic Equipment Standard<br>Applies to EU Member States only: this system should not be treated as household waste.<br>The manufacturer meets the WEEE Standard. For more information on returning or recycling this system, please contact the manufacturer or the distributor from whom you purchased the system. |
|  | Non-ionizing radiation                                                                                                                                                                                                                                                                                                                      |

## 3 Getting Started

---

### 3.1 System Layout

Before placing the system, please carefully read and understand the safety notes so as to guarantee the safety of the personnel and equipment.

1. Turn off the power, and pull out its plug.
2. Disconnect all the peripherals.
3. Hold the handle to move this system, and place it in preset position.
4. At least 20cm space should be reserved from the back and two sides of the system.



**Caution: Make sure that enough space is reserved from the back and two sides of this system for the convenience of plugging and unplugging the power cord, and for fear that temperature increase inside the machine would damage the system.**

### 3.2 External Power Connection and Grounding

This system works under the condition that external power is connected or battery power is enough.

#### 3.2.1 Connecting External Power

Before connecting, make sure the power supply meets the following requirements:

1. Power voltage: AC 100V~240V
2. Power frequency: 50Hz/60Hz

#### 3.2.2 Battery Power

When the system connected with external power boots and works normally, the system is supplied by external power. If there is a battery installed in the machine, then the battery is being charged. When the system is working without external power, it could be supplied by rechargeable Li-ion battery.

For detailed operations and notes of using the battery, please refer to “*Chapter 9 Battery*”.

#### 3.2.3 Grounding Terminal Connection

The equipotential terminal is used to balance the protective-grounding potential between this system and other electrical equipment. For the equipotential terminal of this system, please refer

to the contents in “2.8.3 Back view”.



**Warning :**

1. Equipotential wires must be connected before plugging the equipment power into the outlet.
2. In order to avoid electric shock, the equipment must be unplugged before removing the equipotential wires.
3. When other equipment is connected to this system, equipotential cables must be used to connect each equipotential terminal in case of electric shock.
4. Grounding equipment must be connected according the local regulations.
5. Protective-grounding wires must be connected before power on to avoid electric shock.
6. The protective-grounding wires must be disconnected after power off to avoid electric shock.

### 3.3 Power On/Off

#### 3.3.1 Power On



**Caution:**

1. In order to ensure that the system runs safely and effectively, its daily maintenance must be guaranteed.
2. Once an abnormality is found, please power off the system immediately, and contact our company or our authorized agents. Using the abnormal system will injury the patient and damage the system.

■ Inspection before power on

Please carefully inspect and operate per the following items before power on:

| Item | Inspection item                                                                                    |
|------|----------------------------------------------------------------------------------------------------|
| 1    | Whether the grid voltage meets the requirements of working conditions or not.                      |
| 2    | Temperature, humidity and atmospheric pressure should meet the requirements of working conditions. |
| 3    | There cannot be condensation in working environment and on the equipment.                          |
| 4    | The system and peripherals can't be deformed, destructed, or with stains.                          |
| 5    | Such parts as the monitor and console can't be loose or with a loose screw.                        |

|    |                                                                                                                 |
|----|-----------------------------------------------------------------------------------------------------------------|
| 6  | Power wires or probe cables can't be damaged or the connector's joint part can't be loose.                      |
| 7  | Clean disinfect and sterilize the probe properly according to its maintenance instructions.                     |
| 8  | Please don't place sundries on control panel.                                                                   |
| 9  | Inspect the system's outlet and all exposed ports to ensure no abnormality such as damage or external blockage. |
| 10 | There cannot be any obstacles in the vicinity of the system's movable area and ventilation opening.             |
| 11 | Clean working environment and place.                                                                            |

■ Power on and the inspection after power on

Turn on the power, and long press  key on console for 2 seconds, then the working light is on. With a "beep" sound, the system starts to boot. After normal booting, the image interface is displayed.

To inspect whether the equipment boots normally, please perform inspections according to the following items:

| No. | Inspection Items                                                                                     |
|-----|------------------------------------------------------------------------------------------------------|
| 1   | There cannot be abnormal sound, smell or overheat.                                                   |
| 2   | The system has no error messages.                                                                    |
| 3   | There cannot be obvious abnormal noise, discontinuous display or abnormal dark zone on the 2D image. |
| 4   | Inspect whether the probe's surface is abnormally hot while using it.                                |
| 5   | Whether the buttons or knobs function normally.                                                      |
| 6   | Whether the system time is consistent with the current inspection time.                              |



**Warning:**

1. Using the abnormally-hot probe may burn the animal.
2. Once an abnormality is found, indicating that the system is broken, please power it off immediately, and contact our company or our agents. Using the abnormal system will injure the animal and damage the system.

### 3.3.2 Rebooting after Failure:

When an abnormality occurs, please power off the system, and then wait at least 5 minutes

before rebooting it.

1. The screen displays abnormally.
2. Error message is displayed on the screen, constantly.
3. The corresponding operation is discontinued.

### 3.3.3 Power off

If the system will not be used for a long time, power it off and then cut off its power supply, its connection with the power grid, and the power of all the peripherals connected with it.

- Correct power off operation:

Press the  key on operation panel, 10 seconds later, power off the system, then turn off the power switch on the back of the system.

- If the system power can't be turned off normally for a long time:

Turn off the power switch on the back of the machine directly to cut off the power. As it is mandatory power off, which may cause data loss, so please don't try this method generally.

Caution: Directly turning off the power switch at the back of the system can cut off the power mandatorily, but it may cause data damage or loss. So don't try this method of power off if not necessary.

## 3.4 Probe Connection and Disassembling



**Caution:**

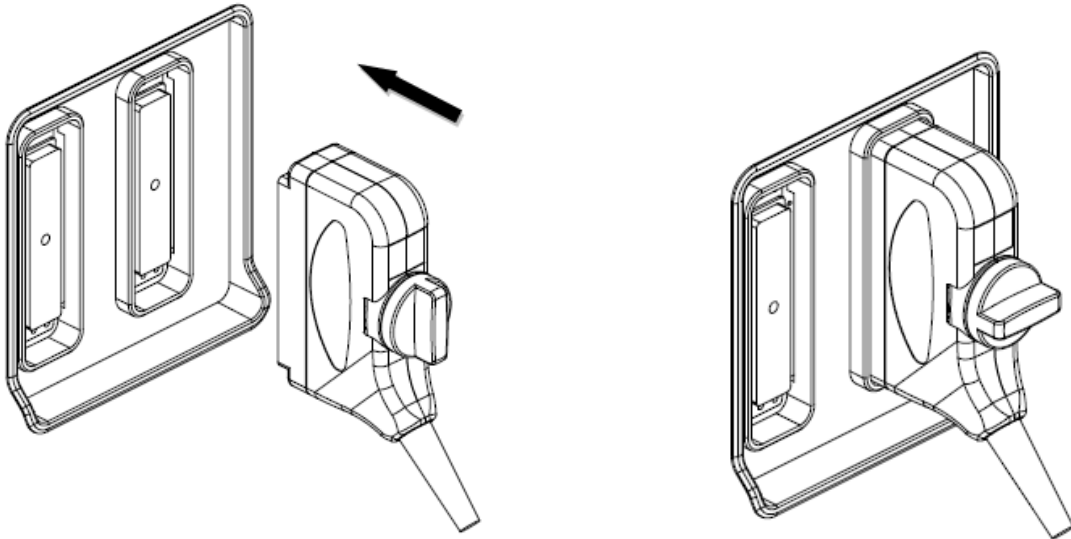
1. Before plugging or unplugging the probe, make sure that the system is in frozen state, or power off. Otherwise, it may cause failure;
2. When plugging or unplugging the probe, put it into its holder and hang the probe cable on its hook so as to prevent damage from accidental drops.
3. When using the probe, hang its cable on its hook in case of distortion and damage caused by excessive force on its outlet.
4. The probe used in this system must be provided by our company only. Attempt to use other probes will damage the equipment and probe(s), and cause unpredictable accidents or failures.

### 3.4.1 Probe Connection



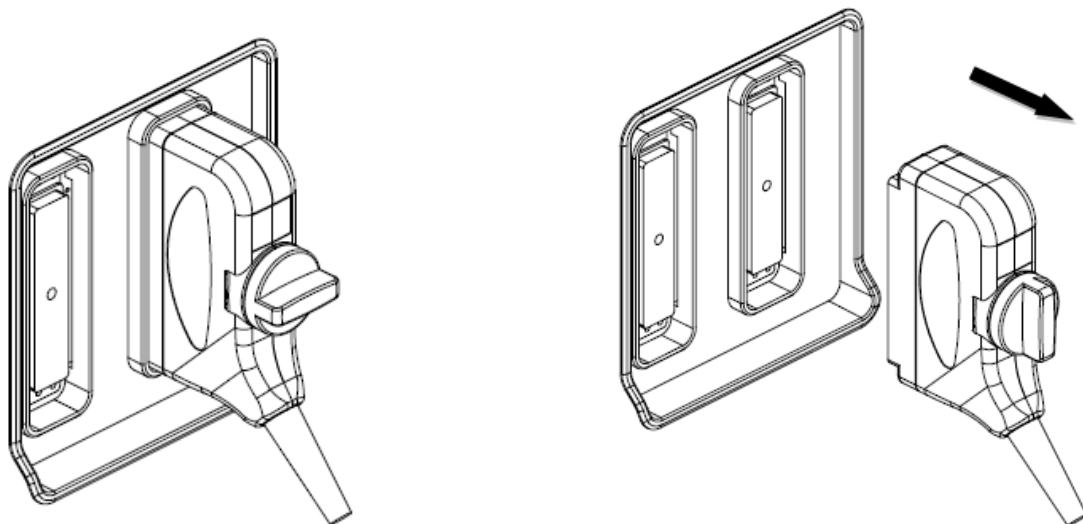
**Warning:** Before connecting the probe, make sure that probe's matching surface, cable and outlet are in normal state without cracks or sheds. Using a defective probe may cause electric shock.

1. Turn the lock switch of probe connector to the vertical direction, with the cable facing down, insert the probe connector into the probe socket, and press it tight.
2. Turn the probe connector lock switch 90 degrees clockwise to the horizontal position and lock it, as shown in the figure below.



### 3.4.2 Probe Disassembling

Turn the probe connector lock switch 90 degrees counterclockwise to the vertical direction, and pull out the probe connector vertically, as shown in the figure below.



**Caution: Before plugging or unplugging the probe, make sure that the system is in frozen status, or power off. Otherwise, it may cause failure.**

## 3.5 Printer

### ■ Printer Connection

The printer is diagramed as follows with power cable and data cable. The power cable is required to plug directly into the outlet with well-protected grounding.



1. Connect the data cable to the USB (B type) port of this ultrasound system.
2. Plug the power cable into the outlet with well-protected grounding.
3. Power on the ultrasound system and printer. It starts printing when the printer's ready light is on.



**Warning:**

1. The data cable used in the printer must be provided by our company. Otherwise the printer would not work.
2. The printing interval between two patient reports should be at least 20s.

■ **Printer Troubleshooting**

1. Paper jam

When the paper is jammed while printing, please take out the jammed paper first and then restart the printer

2. Unclear printout

When the printout are unclear, please change another ink box and restart the printer



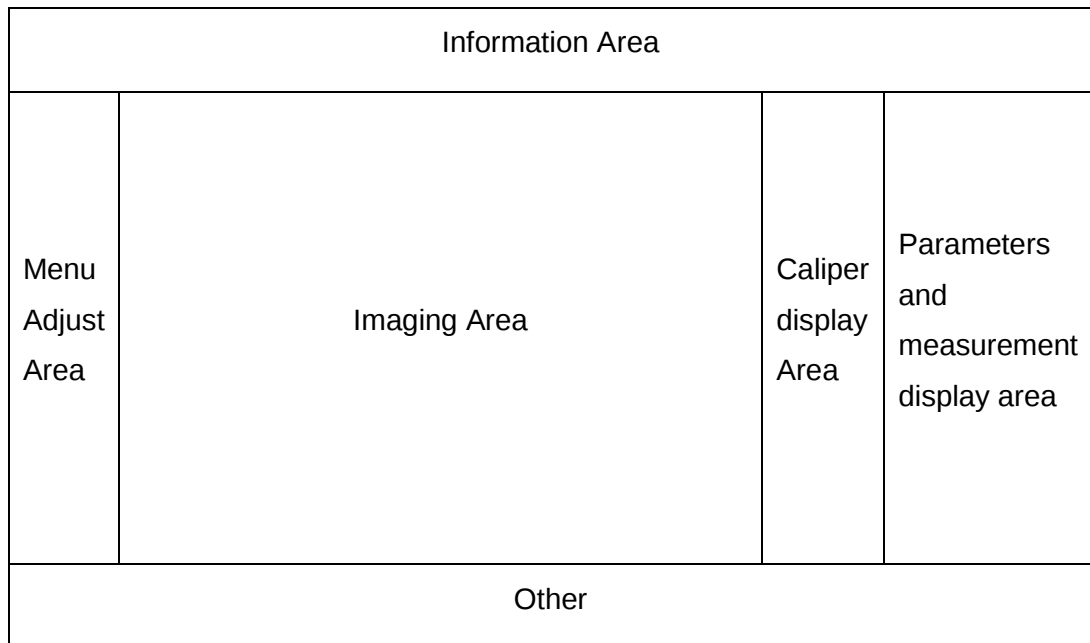
**Warning: When the printer breaks down, be sure to restart it after troubleshooting. Otherwise the printer will not work normally.**

## 4 Main Working Interface

---

### 4.1 Working Interface

Working interface refers to a platform that displays ultrasound images, various parameters and corresponding operation menu on the monitor. Its main areas are distributed as follows:



### 4.2 Information Area

Information Area includes: manufacturer logo, hospital name, subject, transducer type, animal name, gender, age.

- ◆ Manufacturer logo  
Our company logo
- ◆ Hospital Name:  
Displays the name of the hospital that has been set.
- ◆ Subject  
Display the preset subject. Press **Probe** button , Select the corresponding subject.
- ◆ Transducer type  
Display the transducer type, Press **Probe** button , Select the corresponding transducer.
- ◆ animal gender, age, name  
Display gender, age, name. Press **Patient** button, Input corresponding information.

### 4.3 Menu Area

This area mainly displays the control menu of image adjusting and optimizing parameters. Adjust and control by selecting associated buttons and the cursor. Besides, this area also displays the module menu of system setup, parameters setup, subject, body mark, general measurement and specialized measurement . The specific display and operation are described briefly below:

| No. | Mode/Menu | Menu function                                                                                                                                                                                       | Adjustment                                                                                                                                                                                                                                                                       |
|-----|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | 2D Mode   | System setup: Pseudo C., B/W Invert, Reverse, Mirror , Gamma Corr., Brightness, Contrast, Frame Corr., Gray Scale, Smooth, TSI, Focus No. Scan Angle, S. Power, Central Line, Biopsy.               | <ul style="list-style-type: none"> <li>■ Select the desired menu with <b>Cursor</b> &amp; press <b>Set</b>, then turn <b>Value</b> knob to adjust.</li> <li>■ Exceptional menu can be directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul> |
| 2   | 2DMode    | Measure & Calculate setup: Ellipse method and locus method                                                                                                                                          | <ul style="list-style-type: none"> <li>■ Directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul>                                                                                                                                              |
| 3   | PW Mode   | System setup: Pseudo C, PW invert, B/W invert, Gamma Corr., Brightness, Contrast, PRF, SVD, SV, Angle, Baseline, Speed, WF, Smooth, Threshold, Auto track, DR, Enhancement, Noise Reduction, Volume | <ul style="list-style-type: none"> <li>■ Select the desired menu with <b>Cursor</b> &amp; press <b>Set</b>, then turn <b>Value</b> knob to adjust.</li> <li>■ Exceptional menu can be directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul> |
| 4   | 2D Mode   | Language: Multiple languages are available                                                                                                                                                          | <ul style="list-style-type: none"> <li>■ Directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul>                                                                                                                                              |
| 5   | 2D Mode   | Date & Time Setup: Date Setup, Week Setup, Time Setup, Date Format, Time Format.                                                                                                                    | <ul style="list-style-type: none"> <li>■ Select the desired menu with <b>Cursor</b> &amp; press <b>Set</b>, then turn <b>Value</b> knob to adjust.</li> <li>■ Exceptional menu can be directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul> |

|   |         |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|---------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | 2D Mode | Image Save Setup: Save to U disk, Save to local.                                                                                                   | <ul style="list-style-type: none"> <li>■ Directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul>                                                                                                                                                                                                                                                               |
| 7 | 2D Mode | Factory Reset: Restore Current App To Factory Settings. Restore System To Factory Settings.                                                        | <ul style="list-style-type: none"> <li>■ Directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> </ul>                                                                                                                                                                                                                                                               |
| 8 | 2D Mode | Others: Screensaver, Auto Freeze, Parallel Scale, Vertical Scale, Gray Scale Bar, M Speed (Only for B+M, M mode), THI, Hospital, Access authority. | <ul style="list-style-type: none"> <li>■ Select the desired menu with <b>Cursor</b> &amp; press <b>Set</b>, then turn <b>Value</b> knob to adjust.</li> <li>■ Exceptional menu can be directly selected and activated only with <b>Cursor</b> &amp; press <b>Set</b>.</li> <li>■ Access Authority : By using cursor and <b>Set</b> button to select the menu, and then enter password.</li> </ul> |
| 9 | Caliper | Display the Generic and specialized measure menu.                                                                                                  | When the measurement menu displays, select the desired menu with <b>Cursor</b> & press <b>Set</b> .                                                                                                                                                                                                                                                                                               |

## 4.4 Imaging Area

The image area displays the images in various modes. Also it is an area that mainly displays measurements and marks like various annotation texts, calipers etc.

The displayed width and shape of ultrasound images depend on the selected probe and setup, and also depend on the image depth and focus indication. Annotation is to help analyze and instruct the information contained in the images, it also includes the text instruction and arrow indication. Body mark figure provides information of body status and probe direction while sweeping the image.

In generic measurement and special measurement, the annotation information will be displayed in image area.

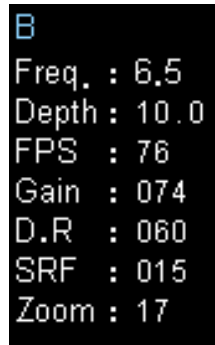
## 4.5 Caliper Display Area

This area displays depth reference scale, gray scale, etc.

## 4.6 Parameters and Measurement Display Area

This area will always display the working parameters of the current image while sweeping; when measurement is activated, its values and calculated result will be displayed.

- Working parameters display: When real-time sweeping works, the parameters will be displayed as follows (the figure below is taken as an example only):



The image shows a black rectangular display area with white text. At the top left is a blue 'B'. Below it, several parameters are listed with their values: Freq. : 6.5, Depth : 10.0, FPS : 76, Gain : 074, D.R : 060, SRF : 015, and Zoom : 17.

| Parameter | Value |
|-----------|-------|
| Freq.     | 6.5   |
| Depth     | 10.0  |
| FPS       | 76    |
| Gain      | 074   |
| D.R       | 060   |
| SRF       | 015   |
| Zoom      | 17    |

As shown above, such parameters are included as: Probe, Freq., Depth, FPS, Gain and DR.SRF, etc.

- Measurement and calculation result display

This area is located below where working parameters display, at the lower right corner of the whole image area. It is used to display the values being measured and corresponding calculation results. The Measurement values are usually displayed in real time. During measurement, move the cursor, and then the measurement values will update with it in real time. After measurement, the measurement value will be displayed stable. Also, related calculation will display corresponding results.

## 4.7 Other

This area will display the system date, time, and cine loop in frozen state.

In frozen state, press **Review** to enter into the continuous image review status. Press **Review** again, and then rotate the **Value** button to review the image frame by frame. Press **Back** to exit the movie playback. M mode is not supported in playback mode.

## 5 Animal Exam

---



**Caution: Before examining a new animal, please press **Patient** and create a new animal ID and enter other basic information so as to avoid confusion of stored animal information.**

When starting a new animal exam, firstly enter the animal information as specific as possible. This system establishes a unique animal information base for the animal, thus avoiding data confusion between new and old animals.

### 5.1 Animal Information

- Enter New Animal Information interface

During the new animal's exam, press **Patient** to enter the new animal information entering interface.

- Exit from New Animal Information interface

Once the new animal information is completely entered, press **Set**, save the information and exit.

#### 5.1.1 New Animal Information

Press **Patient** to enter the Animal Information entry interface. The highlighting box "Examinee Name" required to enter firstly is displayed, Move the cursor, Press set, input the corresponding information, Repeat this operation to complete the relevant content of animal information in turn, and press Confirm to complete the operation of new animal information.

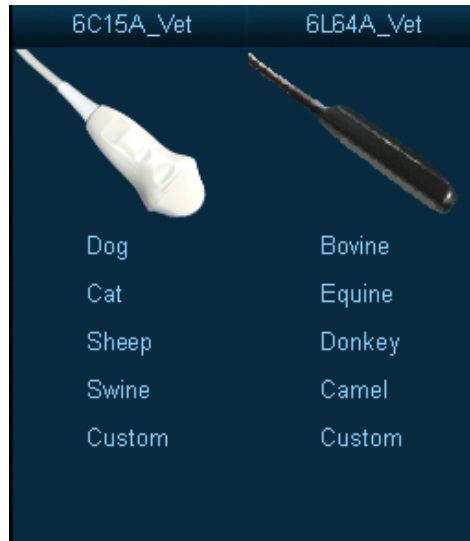
### 5.2 Exam Type Selection

The inspection categories supported by this system: Dog, Cat, Sheep, Swine, Bovine, Equine, Donkey, Camel.

When a check category is selected, the check category is displayed on the screen.

### 5.3 Selecting Probes

1. Press **Probe**, and the following interface displays:



2. Based on the needs for probe connection and animal exam, move the cursor to select the desired probe. The corresponding subject of the probe is highlighted, press Set to finish selecting the probe.

### 5.4 Scanning Mode Selection

Select the scanning mode by corresponding buttons on control panel.

For specific information of operation in different scanning modes, please refer to the chapter *Image Mode*.

### 5.5 Imaging Storage

Caution: Don't store the images in local system for a long term. It is suggested to use external storage media.

Save: including save image and report

Please set the storage location firstly, Save to U disk or save to the machine priority, directly select from the picture saving Settings in the menu.

When the image be frozen, press **Save**, Save it.

### 5.6 Tune Out the Images

Press **Tune Out** , It will Displays files that can be brought up. Combine the trackball with **Set** to browse.

## 5.7 Authority Management

### 5.7.1 Authorization

The user of the system is the administrator

Administrators can turn on or off the U disk storage and printing functions

### 5.7.2 Access authority

If you want to turn on or off the U disk storage and printing functions .Please enter the password and set the path: "system Setup → Access Authority"

1. Click **Access Authority**, and the system will pop up the password input interface
2. After entering the correct password, you can turn on the U disk storage and printing function
3. Enter the password again to close

## 6 Imaging Modes



**Warning:** The image provided in this system is only for the doctor's diagnosis reference. The doctor who performs the exam shall be responsible for accuracy of diagnostic result.

### 6.1 Imaging Mode

This system supports the imaging modes as below:

| Mode    | Imaging  |
|---------|----------|
| 2D Mode | B Mode   |
|         | B+B Mode |
|         | 4B Mode  |
|         | B+M Mode |
|         | M Mode   |
| PW Mode | PW Mode  |

### 6.2 Basic Operation

Before optimizing the image by adjusting its parameters, please adjust the contrast and brightness of the monitor to make it work in its best status.

| Target                      | Optional operation                           |
|-----------------------------|----------------------------------------------|
| Change the brightness       | Adjust the gain                              |
|                             | Adjust the TGC corresponding to target area. |
|                             | Adjust the S.Power                           |
| Change the gray scale image | Adjust the dynamic range                     |
|                             | Adjust the frame correlation                 |
| Observe the deeper image    | Increase the depth                           |
| Observe the shallower image | Reduce the depth                             |

### 6.3 Image Parameters Adjustment

Image parameters adjustment is controlled and realized mainly through image menu and control panel.

### Main steps of image menu control:

Press **Menu**, move the trackball to the desired menu, press **Set**, rotate **Value** knob to adjust the corresponding value for respective parameters within the limit.

### ◆ Main steps of the console operation:

As required, press **Depth** and **Focus No.**, turn **Value** knob to adjust the corresponding value for respective parameters within the limit.

## 6.4 B Mode

B mode is the most basic imaging mode. It displays the anatomy plane of live tissues and organs.

### 6.4.1 B mode Operation

1. Enter the animal information, select the probe and image mode.
2. Press **B** to enter B mode.
3. Adjust imaging parameters to acquire the optimized image.
4. Perform other operations such as measurement and calculation, to acquire necessary data.

### 6.4.2 B mode Image Adjustment

#### ✓ Gain

The total gain of the two-dimensional image, the value will be displayed in real time in the image parameter area on the right side of the screen.

Rotate the Gain knob clockwise to increase the gain and counterclockwise. decrease the gain .

Increasing the gain increases the brightness of the image, allowing more echo signals to be observed, but it also brings more noise.

#### ✓ Depth

Used to adjust the depth of image display. The depth value is displayed in the image parameter area on the right side of the screen in real time.

Press the **Depth** button on the control panel and rotate the **Value** adjustment Value knob to increase or decrease the display Depth of B image.

The adjustable image depth range of different probes is different.

The deeper the depth, the more extensive the observed organization;The smaller the depth, the shallower the tissue observed.

As the depth increases, the frame rate decreases.

✓ **TGC**

The attenuation caused by the increase of tissue depth was compensated and the depth gain was adjusted in the segmented form.

Adjustment is made by controlling slide bar in 8 sections on the control panel, corresponding to segmented images of corresponding depths respectively.

Push the slide bar to the right to increase the gain and increase the brightness of the image in the corresponding region; Push the slide bar to the left to reduce the gain and darken the image in the corresponding region.

By adjusting the signal gain in the specific depth range, the echo of the tissue image is uniform.

✓ **S.Power**

Acoustic power refers to the power of ultrasonic wave emitted by the probe.

Move the cursor to select the item **S.power** on the menu, click **Set**, and rotate the **Value** knob to adjust.

In clinical application, the appropriate sound power should be selected according to the actual situation and "ALARA sound power principle".

✓ **Frequency**

Depending on the type of probe, the working frequency of the adjustable image is different, and the frequency value is displayed in the image parameter area on the right side of the screen in real time.

Click the **Freq** key on the control panel to adjust. When the **THI** item on the menu is selected, the harmonic frequency can be displayed. The harmonic frequency is represented by **H**.

The frequency adjustable range of different probes is different, according to the needs of probe depth and organizational characteristics.

The higher the frequency, the better the near field resolution, but the penetration decreases.

✓ **Focus**

Focus is the adjustment of the focus of the emission acoustic beam, and the "" symbol corresponding to the focus area is displayed on the right side of the image in real time.

Move the cursor to select the item **Focus No.** on the menu, click **Set**, and rotate the **Value** knob to adjust the amount of focus.

Press the **Focus** button on the control panel and rotate the **Value** knob to adjust the Focus position.

In the B mode, the number of focal points can be adjusted from 1 to 4.

The contrast and resolution of the image at the focal zone will increase to obtain clearer image information.

✓ **Scan Angle**

Move the cursor to select the **Scan Angle** item on the menu, click **Set**, and then rotate the **Value** knob to adjust.

✓ **Dynamic range**

Adjust the contrast of black and white images, compress or extend the gray scale display range. Dynamic range values are displayed in real time in the image parameter area on the right side of the screen.

Press the **DR** button, and then rotate the **Value** knob to adjust.

Adjusting the dynamic range, from the perspective of sensory sense, adjusts the contrast intensity of the image; In terms of working principle, for the selected gray-scale curve, the larger the dynamic range, the darker the overall image, the smaller the contrast, and the increased noise.

✓ **Frame Corr.**

B images of adjacent frames are superimposed and averaged for image optimization.

Move the cursor to select the **Frame Corr.** item on the menu, click **Set**, and rotate the **Value** knob to adjust.

✓ **Gray Scale**

Move the cursor to select the **Gray Scale** item on the menu, click **Set**, and rotate the **Value** knob to adjust.

✓ **Smooth**

Smooth the image to make its appearance and edge softer.

Move the cursor to select the sub menu **Smooth** item on the menu . Press **Set**, Rotate **Value** knob to adjust it.

Larger value makes the image more exquisite.

✓ **TSI**

TSI (Tissue Statistic Imaging) refers to a method of selecting the sound speed according to tissue statistics to make the image more typical.

Move the cursor to select the sub menu **TSI** item on the menu. Press **Set**, Rotate **Value** knob to adjust it.

✓ **SRF**

Press **SRF** on the control panel directly, Rotate **Value** knob to adjust it.

✓ **Pseudo C.**

Pseudo C. function refers to the imaging by color difference instead of grayness difference, which distinguishes the image's grayness differences more intuitively.

Move the cursor to select the sub menu **Pseudo C.** Press **Set**, Rotate **Value** knob to adjust it.

✓ **Gamma Corr.**

It is used to correct the nonlinear distortion of image vision.

Move the cursor to select the sub menu **Gamma Corr.** on the menu. Press **Set**, Rotate **Value** knob to adjust it.

When correction value increases, the image grayness will turn dark, otherwise it will turn bright.

✓ **Reverse/Mirror**

Get a better view by changing the way the image is displayed.

Vertical flip up and down and horizontal flip left and right.

Move the cursor to select the **Reverse** or **Mirror** item on the menu, click **Set** key, and flip or cancel the flip.

The image direction is identified by the "R" mark on the screen. The R mark in the upper right corner is the default image direction of the system.

✓ **B/W Invert**

Flip polarity to display gray-scale images.

Move the cursor to select the **B/W Invert** item on the menu, click **Set**, and flip or cancel the reverse.

✓ **Central Line**

Move the cursor to select the **central Line** item on the menu, and click **Set** to display or cancel the center line.

✓ **Biopsy**

Move the cursor to select the item **Biopsy** on the menu, click **Set**, and then rotate the **Value** knob to adjust.

This system supports setting 0°, 30°, 45° and 60°.

✓ **Screensaver**

Move the cursor to select **Screensaver** settings in the menu, click **Set**, and then rotate the **Value** knob to adjust.

When the screen saver is set to 0, the screen saver is cancelled.

✓ **Auto Freeze**

Move the cursor to select the **Auto Freeze** item on the menu, click **Set**, Freeze or defreeze

✓ **Parallel Scale/Vertical Scale**

Move the cursor to select **Parallel Scale** or **Vertical Scale** in the menu, click **Set**, and set to show or hide horizontal ruler or vertical ruler.

The scale of the parallel scale is the same as that of the vertical (depth) scale. When the scale of the vertical ruler changes, the scale of the horizontal ruler also changes, such as in the magnification mode.

✓ **Date & Time Setup**

Move the cursor to select the **Date & Time Setup** item on the menu, click **Set**, and then rotate the **Value** knob to adjust the date, week and time.

Date format and time format can be selected directly by cursor and **Set** key.

✓ **Gray Scale Bar**

Move the cursor to select the Gray Scale Bar item on the menu, click **Set**, and **Set** to show or hide the gray bar.

✓ **Zoom**

Press the **Z** button on the control panel and rotate the **Value** knob to scale the image.

✓ **FSI**

Press the **FSI** on the control panel, the current image will full screen imaging display

## **6.5 M Mode**

### **6.5.1 M Mode Operation**

1. In B mode scanning status, select an optimized B mode image, and adjust the probe and image to make the target area in image center.
2. Press **BM**, and enter into localization status of BM mode sampling line, turn **Value** knob to locate the sampling line on target area.
3. Press **M**, enter into M mode scanning status, and observe the live tissue's status combined with B mode anatomy diagram.
4. Adjust image parameters to acquire the most optimized image during scanning.
5. Perform other operations such as measurement and calculation to acquire necessary data.

## 6.5.2 M Mode Image Adjustment

### ◆ M Image Optimization and Adjustment

Meanings and adjusting methods of M image parameters are mostly similar with those of B mode, which will not be described here in details. Please refer to B mode Image Optimization Adjustment.

#### ✓ M Speed

Move the cursor to select the **M Speed** item on the menu. Press **Set**, Rotate **Value** knob to control the M mode updating speed.

Smaller value makes faster updating.

Abnormality in cycle time can be found by changing the scanning speed.

### ◆ M Performance Indicator

M mode performance indicator of each probe, the time display deviation is no higher than 10%.

## 6.6 PW Mode

### 6.6.1 PW Mode Operation

1. In B mode, select a high-quality image and adjust the probe and image so that the target area is located in the center of the mode B image.
2. Press **P**, slide the trackball put the sampling line on the target area(Press **set** for linear probe)
3. Press **P** again, only display real time PW mode.
4. Continue to press **P**, full screen display the PW.
5. During the scanning, real-time adjust image parameter can get the best pw image.
6. After that , You can do other operation(Measurement and Calculation) to get the necessary data information.

### 6.6.2 PW Mode Image Adjustable

#### ✓ Gain

In pw mode ,Rotate **Gain** button ,Adjust clockwise to increase gain, counterclockwise to decrease gain.

Increasing the gain increases the brightness of the image, allowing more echo signals to be observed, but it also brings more noise.

#### ✓ PRF

In pw mode , move the cursor to select **PRF** on menu , press **Set** button , then rotate **Value** button to adjust.

✓ **SVD**

In pw mode , slide the trackball to change sampling volume depth.

✓ **Sampling Line Angle**

In pw mode , slide trackball ( press **Set** for linear probe ) to change sampling line angle.

✓ **SV**

In pw mode , move the cursor to select **SV** on menu , press **Set** button , and rotate **Value** button to adjust.

The smaller the SV, the more accurate the results.

✓ **Angle**

In pw mode ,move the cursor to select **Angle** on menu ,press **Set** button ,and rotate **Value** button to adjust.

After adjustment, the measured speed should be as close as possible to the actual speed.

✓ **Baseline**

In pw mode , move the cursor to select **Baseline** on menu , press **Set** button , and rotate **Value** button to adjust.

✓ **Speed**

In pw mode ,move the cursor to select **Speed** on menu ,press **Set** button ,and rotate **Value** button to adjust.

Control the speed of spectral Doppler mode imaging output, the smaller the value, the faster the refresh speed.

✓ **WF**

In pw mode , move the cursor to select **WF** on menu , press **Set** button , and rotate **Value** button to adjust.

Filter low frequency noise, reduce the impact of breathing and other activities.

✓ **DR**

In pw mode , move the cursor to select **DR** on menu , press **Set** button , and rotate **Value** button to adjust.

The larger the dynamic range is, the richer the layers and more information are displayed, but the noise will also increase.

✓ **Enhancement**

In pw mode , move the cursor to select **Enhancement** on menu , press **Set** button , and rotate **Value** button to adjust.

✓ **Noise Reduction**

In pw mode , move the cursor to select **Noise Reduction** on menu , press **Set** button , and rotate **Value** button to adjust.

✓ **Volume**

In pw mode , move the cursor to select **Volume** on menu , press **Set** button , and rotate **Value** button to adjust.

Control and adjust the output audio size of spectrum Doppler.

## 7 Measurements

Measurements can be divided into generic measurement and special measurement; Measurements can be performed in real-time image or frozen image.



**Warning: Please verify that the measurement target and image are correct, and measurement area is effective. Otherwise, it will lead to misdiagnosis.**



**Caution: During measurement, all calipers and annotations on the image will be cleaned if the probe is switched.**

### 7.1 Basic Operation

#### 7.1.1 Enter/Exit Measurement

On the control panel, press **+...+ Caliper** to enter measurement ;  
Press **Clean** to exit measurement.

#### 7.1.2 Button Function

| Button    | Basic Operation                                                                                                                                                               |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Caliper   | Enter the generic or special measurement.                                                                                                                                     |
| Set       | Select a measurement item on the menu, and press <b>Set</b> to activate it.<br>During measurement, press <b>Set</b> to switch the fixed point and active point of the caliper |
| Back      | Return to previous step or delete corresponding caliper of each measurement in reverse order.                                                                                 |
| Clean     | Delete all calipers on the screen and data in result window.                                                                                                                  |
| Report    | Edit the report                                                                                                                                                               |
| Trackball | Move the cursor                                                                                                                                                               |

#### 7.1.3 Measurement Item

The system provides generic and special measurement.

- Generic measurement: items on generic menu, including basic tools and methods such as “Distance” and “Area” etc.
- Special measurement: items on special menu. Therein, different exam modes correspond to one or more measuring packages.

Note: Most of special measuring items are using generic measurement tools. For example, “Dog” in obstetric 2D is measured by generic tool “BPD”. The difference is that special measuring items correspond to some clinical significance, and the result will be recorded in associated report.

The system supports following types of special measurement

- Dog
- Cat
- Sheep
- Swine
- Bovine
- Equine

### Activating measuring items

Steps are as follows:

1. Move the cursor to desired measuring item, press **Set**.
2. If there is a sub menu, press **Set** to enter into it.
3. In sub menu, press the item in the menu to activate its measurement.

### 7.1.4 Measurement Scale

Measurement scale is drawn on ultrasound images; it is a geometrical figure composed of several endpoints, straight lines or curves.

#### ■ Fixed /Active endpoints

Scale endpoints are classified as active and fixed. Therein, active point is named as measurement cursor.

#### ■ Scale color

The system defaults the end points and line segments of the measuring ruler to be green when active and fixed.

#### ■ Movement of scale endpoints

➤ Move with **Trackball**.

➤ Press the direction key ▲, ▼, ◀, ▶ for moving, and long press the key for quick moving.

#### ■ Symbols of scale endpoint

Different symbols are displayed respectively at scale endpoint (the head and end symbols are the same) and in result window to distinguish different measurements.

### 7.1.5 Measurement Result Window Display

Measurement result is displayed in real time at right bottom of screen and updated.

During measurement, the result display has following situations:

1. Activate the measurement item without moving the cursor, the result will display blank;
2. If there is a result within clinical scope, its specific value will be displayed;
3. If the result exceeds ultrasound scope, the result will display blank.

## 7.2 Measurement Report

Measurement report is used to record measurement results. But generic measurement result will not be recorded in the report.

Note: Generic measurement result is not recorded in the report.

1. Select appropriate probe and corresponding subject.
2. Press the button **Patient**, enter the relevant information of the animal, and press **Confirm** to exit the interface.
3. Select the appropriate image section and press the **Freeze** button. At the same time, the storage area appears under the image. Press **+...+ Caliper** to enter the measurement  
**Save image**: move the cursor to the image storage area and press **Set** to save images, up to 4 images.  
**Delete image**: move the cursor to the saved image and press **Back Space** ← on the panel to delete the image.
4. Press **Report** repeatedly to pop up the following interface.

- Animal information

|                                                                                     |                    |                                      |                |    |                |    |
|-------------------------------------------------------------------------------------|--------------------|--------------------------------------|----------------|----|----------------|----|
|  |                    | <b>Ultrasound Examination Report</b> |                |    | <b>Date:</b>   |    |
| <b>Name:</b>                                                                        | <b>Gender:</b>     | <b>Age:</b>                          | <b>Height:</b> | cm | <b>Weight:</b> | KG |
| <b>App :</b>                                                                        | <b>InHouse No:</b> | <b>Ultrasound No:</b>                |                |    |                |    |

- Measurement display

**Meas. Display**

Measuring data will be recorded within the box (except generic measuring data). In **Special Meas.**, if an item is measured several times, the report will show its average Value.

- Image display

**Img. Display**

- USG observed

**Observed**

The diagnostic physician will fill in what is displayed on ultrasound scanner.

- USG diagnose

**Diagnose**

**Diagnose Ref. only. Not for other purpose**

**Doctor:** \_\_\_\_\_

**Tel:** \_\_\_\_\_

The diagnostic physician will fill in ultrasound prompts.

- Word information preview
- Image preview
- Whole report preview
- Press **Report** finally, exit report interface.

5. Press **Print** button , print the current report.

## 7.3 2D Generic Measurement

### 7.3.1 Distance

Function: Measure the distance between two points on ultrasound image.

1. Select "Distance" in generic menu, then measurement cursor displays on the screen.
2. Move the cursor to the measurement start point with **Trackball**.
3. Press **Set** to set the measurement start point.
4. Move the cursor to the measurement end point with trackball. Press **Set** to activate the two cursors alternately, thus achieving reset of the cursors.
5. Long press **Set** to confirm the measurement end point, the result will be displayed in result window.

### 7.3.2 Area and Circumference

Function: Measure area and circumference of a closed region in the ultrasound image.

1. Select “Area and Circumference” on generic menu, then an oval will appear on the screen.
2. Move the cursor to a certain point of measuring area with **Trackball**.
3. Press **Set** to set the start point of first shaft of oval.
4. Move the cursor to the end point of first shaft of oval, press **Set** to confirm it.
5. Move the cursor, the length of second oval axis will change with the cursor’s movement.  
Move the cursor to make the oval as close to the measuring area as possible.
6. Press **Set** to confirm the oval measuring area, the result will be displayed in result window.

### 7.3.3 Depth

Function: Measure the distance from probe surface along the direction of ultrasound waves to the measuring cursor.

1. Select “Depth” on generic menu, the cursor will appear on the screen.
2. Move the trackball to locate the cursor at the measuring point.
3. Long press **Set** to confirm the measuring point, the result will be displayed in result window.

### 7.3.4 Volume

Function: Measure the volume of a target object by ultrasound image.

Measurement methods:

#### ■ 3 Distance

This method applies for simultaneously displaying two scanning surfaces of the mutually perpendicular objects under B+B mode. By measuring the length of three axes of the target object, its volume can be calculated. The formula is:

$$\text{Volume ( cm }^3 \text{ )} = \frac{\pi}{6} \times D1 \text{ (cm)} \times D2 \text{ (cm)} \times D3 \text{ (cm)}$$

therein, D1 ( distance 1 ) , D2 ( distance 2 ) , D3 ( distance 3 ) are the lengths of three axes of the target object.

1. Select “Volume →3 Distance.” on generic menu, the cursor will appear on the screen .
2. Measure the length of three axes of the target object separately.  
For measuring methods, please refer to distance measurement.  
In general, D1, D2 and D3 should not be on a scanning section at the same time.
3. After measurement, the volume value will be displayed in result window.

#### ■ Ellipse Dist

By measuring vertical section and horizontal section of the target object, its volume can be

calculated. The formula is:

$$\text{Volume ( cm}^3 \text{ )} = \frac{\pi}{6} \times a \text{ (cm)} \times b \text{ (cm)} \times m \text{ (cm)}$$

$a$  is major axis length ,  $b$  is minor axis length,  $m$  is third axis length

1. Select “Volume → Ellipse Distance.” on generic menu, the cursor will appear on the screen.
2. Use the Ellipse method to measure the area of vertical section.  
Please refer to Area and Circumference Measurement for methods.
3. Defreeze the image, rescan the plane image which is vertical cross of former image, and then freeze it.
4. Use the Distance Measurement method to measure the length of the third axis.
5. After measurement and then the volume value will be displayed in result window.

#### ■ Ellipse

By measuring vertical plane of the target object, its volume can be calculated. The formula is:

$$\text{Volume ( cm}^3 \text{ )} = \frac{\pi}{6} \times a \text{ (cm)} \times b^2 \text{ (cm)}$$

$a$  is major axis length ,  $b$  is minor axis length

1. Select “Volume → Ellipse”, the cursor will appear on the screen.
2. Use the Ellipse method to measure the volume. Refer to Area and Circumference measurement for methods.

### 7.3.5 Angel

Function: On 2D ultrasound image, measure the intersection angle of two intersecting planes, the range is from 0 to 180°.

1. Select “Angle” on generic menu, the cursor will appear on the screen
2. Refer to Distance measurement method to set two lines of distance1, distance2.
3. After setup, angle value will be displayed in result window.

### 7.3.6 Ratio

#### ■ Length Ratio

Function: Measure the length of two lines on ultrasound image, and calculate the ratio.

1. Select “Ratio → Length Ratio” on generic menu, the cursor will appear on the screen.
2. Measure the length of two lines separately with reference to the Distance measurement method.
3. After measurement, Len. Ratio value will be displayed in result window.

#### ■ Area Ratio

Function: Measuring the area of two enclosed area on ultrasound image and calculate ratio

1. Select "Ratio → Area Ratio " on generic menu, the cursor will appear on the screen.
2. Measure the values of Area 1 and Area 2 separately with reference to Area and Circumference measuring method.
3. After measurement, Area Ratio value will be displayed in result window.

## 7.4 M Generic Measurement

### 7.4.1 Distance

Function: Measuring the distance between two points on M mode image.

1. In M mode, select the appropriate image section and then press **Freeze**.
2. Press **+...+Caliper**. Select "Distance" on generic menu, the cursor and a vertical dashed line will appear on the screen.
3. Move the cursor to the start point, press **Set** for confirmation.
4. Move the cursor to the end point, then press **Set** to activate two cursors alternatively for relocation.
5. Long press **Set** to confirm the end point, the result will be displayed in result window.

### 7.4.2 Time

Function: Measure the time interval between two points on M image.

1. In M mode, select the appropriate image section and then press **Freeze**,
2. Press **+...+Caliper**. Select "Time" on generic menu, the cursor and two paralleled dashed lines will appear on the screen.
3. Move the cursor to the start point, press **Set** to confirm it.
4. Move the cursor to the end point, There are two dotted lines parallel to each other on the screen. then press **Set** to activate two cursors alternatively for relocation.
5. Long press **Set** to confirm the end point, the result will be displayed in result window.

### 7.4.3 Heart Rate

Function: On M image, acquire the heartbeat image, and measure time internals in 1 or 2 heartbeat periods. Measure the heart beats per minute.

1. In M mode, select the appropriate image section and then press Freeze,
2. Press **+...+Caliper**. Select "Heart Rate" on generic menu, the measurement cursor and a vertical dashed line appear on the screen.
3. Move the cursor to the start point, press **Set** to confirm it.
4. Move cursor to the end point, There are two dotted lines parallel to each other on the screen. then press **Set** to activate two cursors alternatively for relocation.
5. Long press **Set** to confirm the end point, the result will be displayed in result window.

#### 7.4.4 EF Slope

Function: Measure the distance and time of two points on M mode ultrasound image to calculate EF Slope of the two points.

1. In M mode, select the appropriate image section and then press Freeze,
2. Press **+...+Caliper**. Select "EF Slope" on generic menu, the cursor will appear on the screen.
3. Move the cursor to the start point.
4. Press **Set** to set the start point.
5. Move the cursor to the end point with trackball, then press **Set** to activate two cursors alternatively for relocation.
6. Long press **Set** to confirm the end point, the result will be displayed in result window.

### 7.5 PW Basic Measurement

#### 7.5.1 Velocity

Function: In pw mode , Measure the velocity at a point in the doppler spectrum waveform.

1. Select "Velocity" on the measurement menu, the cursor will be displayed on screen.
2. Move the cursor to the starting point position.
3. Press **Set** to confirm , measurement value will be displayed in results window.

#### 7.5.2 HR

Function: measure the interval between cardiac cycles on Doppler image and calculate the heart rate. The operation steps are similar to the heart rate measurement in the basic measurement of M mode, and the specific content takes part in "7.4.3 heart rate".

#### 7.5.3 Time

Function: Measure the time interval between two points on the Doppler image.

The operation steps are similar to the heart rate measurement in the basic measurement of M, and the specific content takes part in "7.4.2 time".

#### 7.5.4 Acceleration

Function: Measure the velocity of two points on the Doppler image and calculate the acceleration

1. Select "Acceleration" on the measurement menu, the cursor will be displayed on screen.
2. Move the cursor to the starting point position.
3. press **Set** button, confirm the first velocity point.
4. Move the cursor to the second velocity point, and press **Set** to alternately activate the two cursors to achieve the repositioning of the cursor
5. Long press **Set** to confirm the second velocity point, measurement value will be displayed in the results window.

### 7.5.5 Index

1. Select "Index" on the measurement menu, the cursor will be displayed on screen.
2. Move the cursor to the starting point, press **Set** button, Complete the Doppler velocity measurement at the first peak point.
3. Move the cursor to the measuring end point, and press **Set** to alternately activate the two cursors to achieve the repositioning of the cursor
4. Long press **Set** to confirm the end point, measurement value will be displayed in the results window.

## 7.6 Specialized Measurement

### 7.6.1 Dog -BPD

1. Press **Patient**, Input the animal information on "Examinee Information" interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Dog →BPD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

### 7.6.2 Dog -CRL

1. Press **Patient**, Input the animal information on "Examinee Information" interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Dog →CRL", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

### 7.6.3 Dog -HD

1. Press **Patient**, Input the animal information on "Examinee Information" interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Dog →HD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.

5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.4 Dog -GSD

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Dog →GSD”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.5 Cat -BPD

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Cat →BPD”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.6 Cat -HD

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Cat →HD”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.

8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.7 Sheep -CRL

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Sheep →CRL”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.8 Swine -HLA

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Swine →HLA”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.9 Swine -SLA

1. Press **Patient**, Input the animal information on“Examinee Information”interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor “Swine →SLA”, Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.10 Bovine -BTD

1. Press **Patient**, Input the animal information on“Examinee Information”interface.

2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Bovine →BTD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement. while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.11 Bovine-BUD

1. Press **Patient**, Input the animal information on"Examinee Information"interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Bovine →BUD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.12 Equine -ESD

1. Press **Patient**, Input the animal information on"Examinee Information"interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Equine →ESD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing **Set** alternately activate the two cursors to reposition the cursor.
7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

#### 7.6.13 Equine -GSD

1. Press **Patient**, Input the animal information on"Examinee Information"interface.
2. Press **+...+ Caliper** button enter measurement.
3. Move the cursor "Equine→GSD", Press **Set** then the cursor will display on the screen.
4. Use the trackball to move the cursor to the starting point of the measurement.
5. Press **Set** to confirm the starting point of the measurement.
6. Use the trackball to move the cursor to the ending point of the measurement, while pressing

**Set** alternately activate the two cursors to reposition the cursor.

7. Long press **Set** to confirm the ending point. The value will be displayed in the value window.
8. Press **Clean** to exit measurement and clean all the data.

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## 8 Annotation and Body Mark

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### 8.1 Annotation

In the process of diagnosis, usually it's necessary to add annotation to the ultrasound image in order to improve its readability. Annotation can be added to the real-time image or frozen image. This system supports two annotation types: character entering, and indicating arrow.



**Warning: Please verify that added annotation is correct, incorrect annotation may lead to misdiagnosis.**

#### 8.1.1 Annotation Entry /Exit

- Character annotation entry/exit

1. Press **ABC** to enter into character annotation status, the cursor becomes "I".
2. Move the trackball, Press **Set** at the position where the characters need to be edited, and enter any character key (including number key) for editing.
3. Confirm the annotation, please press **ABC** to exit.
4. Press **Clean** to clean the annotation.

- Arrow annotation entry/exit

1. Press **ABC**, and the cursor becomes "I". Then press  to enter into arrow adding status.
2. Press **Set**, and then press **Clean** to exit arrow comments.

#### 8.1.2 Adding Annotations

- Enter character annotations

1. Locate the annotation position

Move the trackball or use the **Set** keys to navigate the cursor in the location which need to add the comments

2. Enter the character

- Enter the desired character on the keyboard directly, the default character is lowercase, press **Caps Lock** repeatedly to switch the character case;
- While entering the top half character, please press **Shift** and desired character key simultaneously.

- Add indicating arrows

Indicating arrows are usually used on the image where needs texts or emphasis.

1. In character annotation status, press key  , and the indicating arrow appears.
2. Press **Set**, the cursor will appear, move the trackball to move the cursor to the place where it needs to be marked, then press **Set** for positioning, and then press  to mark the arrow.
3. If necessary to enter other direction arrows, press key  , and adjust the arrow to the applicable direction with speed of 45° each stall.
4. Repeat steps 2 and 3 to continue adding the arrows.
5. Press **Set**, and then press **Clean** to exit arrow comments.

### 8.1.3 Deleting Annotations

#### ■ Delete character annotations

In character annotation status, press **Clean** to delete all added annotation items.

#### ■ Delete arrow annotations

In arrow annotation status, press **Clean** to delete all added indicating arrows.

## 8.2 Body Mark

Body Mark identifies the probing position and probe scanning direction while examining a animal, it helps illustrate the image.

### 8.2.1 Body Mark Entry/Exit

Press **Body Mark** ,pop-up the body diagram list . Slide trackball and press **Set**, select the body diagram from the pop-up list. After confirm the selected body diagram ,Press **Clean** to exit from body mark.

### 8.2.2 Body Mark Operation

Body mark operation includes: Selecting the body mark and operating the probe mark.

#### ■ Body mark selection

Press **Body Mark** ,press **Set**, and select the body diagram from the pop-up list. The selected body diagram is shown at lower left corner of the image. Press **Set** to confirm the selected body diagram.

#### ■ Probe mark operation

The “” mark on body mark indicates the probe direction. Therein, its horizontal

line indicates the probe surface, and vertical line indicates the direction of the probe cable.

1. When the selected body diagram is shown at lower left corner of the image, turn **Value** knob to change the probe mark direction by step length of 45 degrees.
2. Locate the probe mark on the body mark in appropriate probing position with trackball or direction keys on the keyboard:
  - Press ← key to move the probe mark left
  - Press → key to move the probe mark right
  - Press ↑ key to move the probe mark up
  - Press ↓ key to move the probe mark down

## 9 Battery

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### Warning :

**1. Prohibit disassembling the battery casually**

The internal protection device and circuit inside the battery can avoid possible dangers. Improper disassembly will damage the protection function and cause heating, smoking, deformation or burning.

**2. Prohibit short-circuiting the battery**

Do not use metals to connect positive and negative plates of the battery. Do not move or store the battery together with metals. If the battery is short-circuited, strong current will go through it, which may damage the battery.

**3. Prohibit heating and burning the battery**

Heating and burning will cause melting of the battery separator, loss of protection function or burning of electrolyte. Overheat will cause heating, smoking, deformation or burning of the battery.

**4. Avoid using the battery near heat.**

Please do not use the battery near fire or brazier. Overheat will lead to short circuit inside the battery, and cause heating, smoking, deformation or burning of battery.

**5. Prohibit dampening the battery**

Please do not dampen the battery, nor put it into water. Otherwise it will cause function loss of internal protection circuit and abnormal chemical reaction, and the battery may overheat, deform, smoke or burn.

**6. Avoid recharging the battery near fire or in direct sunlight**

Otherwise it will cause function loss of internal protection circuit and abnormal chemical reaction, and the battery may overheat, deform, smoke or burn.

**7. Prohibit destroying the battery**

Prohibit puncturing the battery with metals, hammering, impacting or destroying the battery by other ways. Otherwise it will cause heating, smoking, deformation or burning of the battery. And even dangers will happen.

**8. Do not use the battery with other types of batteries**

The battery cannot be used with other types of primary or rechargeable batteries.

Otherwise abnormal charge or discharge will cause heating, smoking, deformation or burning of the battery.

**9. Do not put the battery in microwave ovens or other pressure vessels.**

Instant Heating or structure damage will cause heating, smoking, deformation or burning of the battery.

#### **10. Do not use abnormal battery**

**If user find battery having smell, out of shape, changing color or angulated, user should put battery out of machine and do not use it again. Using unusual battery, it will make over heated out of shape, smoke or burned.**

## **9.1 Overview**

The system is configured with the lithium battery to ensure that the machine works normally while moving in the yard or when the power fails. When power fails suddenly, the system will automatically use the battery to charge the machine. Therefore the machine can work continuously without stop.

The battery is being charged when the system is connected with external power.

In general, the battery is discharged fully. Turn off the machine, connect the battery with AC power, and charge it for 3 hours.

The battery is not used for starting up the system, only standby function is supported.

If you need to move the host quickly, you can enter the standby state and then pull out the power cord. Then use the battery standby function. After moving to the target position, plug in the power cord and press the power button to exit the standby state.

#### **Notice:**

1. The battery can be charged by large current when the machine is turned off. It is suggested that users charge the battery in such status for faster speed.
2. If the machine is not used for a long time (such as transportation/storage environment), the machine must be shut down and cannot be in standby state, otherwise it will exhaust the battery and cause permanent damage to the battery

The machine is powered by lithium battery while not connected with external AC power.

**Notice:** Please use the battery designated by the system.

## **9.2 Notes**

1. Before using the battery, please carefully read the labels on its surface.
2. While using the battery for the first time, if the battery is found with abnormalities like unclean or smelling, please stop using it.
3. While using the battery, please keep it far away from heat and high voltage, and do not impact it.
4. Please do not use the battery in strong sunlight light in case of heating, deformation, smoking, or performance degradation of the battery.

5. Put the battery in the place out of children's reach. Prevent children from taking it out or playing with it.
6. The battery only can be charged in this ultrasound system.
7. When the battery is exhausted, if permitted, it should be charged to recover some power in order to avoid its performance degradation.

### 9.3 Battery Installation and Disassembling



**Warning:** Prior to installing or disassembling the battery, please confirm that the machine is turned off, and the system and the power are disconnected. It is prohibited to install or disassemble the battery when the system is open or when the system is closed without cutting off its power supply.

#### ■ Installing the battery

1. Verify that the system is shut down, and disconnected from power supply.
2. Open the battery compartment lid behind the machine, and replace a new dedicated rechargeable battery. When you reinsert the battery leads, please verify that the battery is properly connected with corresponding terminals.

#### ■ Disassembling the battery

1. Verify that the system is shut down, and disconnected from power supply.
2. Open the battery rear lid, unplug the battery guides, and remove the battery from the bay.

### 9.4 Optimize Battery Performance

While using the battery for the first time, or not using the battery for more than 3 months (recommended), Customers are advised to perform a complete discharge/recharge cycle. Suggest storing the fully-charged battery in a cool place.

A complete discharge/charge process:

1. Discharge the battery completely until the system shuts down automatically.
2. Charge the system to full power.
3. Discharge the system until it shuts down completely.

### 9.5 Periodical Inspection of Battery Performance

Battery performance may degrade with time increases. It must be inspected once a year. While inspecting battery performance, please refer to the following steps:

1. Stopping all ultrasound exams.
2. Connect the system to AC power, and charge the battery continuously to full power..
3. Disconnect the AC power; use the battery power to supply the system until the system is shut down.
4. The length of battery life reflects the battery's performance.

If the battery life is reduced obviously, please consider replacing the battery or contacting the maintenance personnel.

## 9.6 Battery Recycling

If the battery is obviously damaged or its power is exhausted, please replace it and properly recycle it.



**Warning : While disposing of the used battery, please follow corresponding laws and regulations.**

## 10 Routine System Maintenance

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Routine maintenance of the system is completed by the customer and service engineers. After purchasing the product, the user has full responsibility for the maintenance and operation of the product.

Notice :

1. Other maintenances not included in this user manual must be completed by the professional trained engineer.
2. In order to guarantee the performance and security of the system, the user must check the machine regularly.

### 10.1 Routine Maintenance

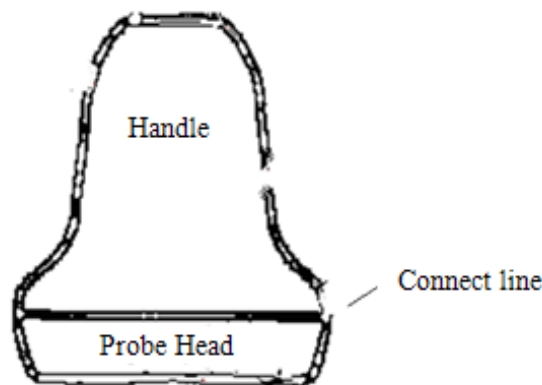
The user is responsible for the routine maintenance of the system.

#### 10.1.1 System Cleaning

Notice: Prior to cleaning the machine, be sure to turn off the machine and unplug the power cable. Cleaning the machine with power on may lead to electric shock.

##### 1. Cleaning the probe

Take linear array as an example to illustrate. The linear array probe is shown as follows:



- The probe belongs to precise electronic equipment. Even very small impact may also cause damage to the probe. Please be very cautious and make sure it is not subject to any impact. Don't crash on any hard objects while using it.
- When connect or disconnect the probe, please firstly confirm the host is frozen or shut down.
- Pay special attention not to scratch the probe surface.

- The part of the probe immersed in the liquid shall not exceed the binding line; Otherwise, it may break down. When this happens, please contact the manufacturer in time.
- When install the probe, please follow the indicating direction to spin the lock bolt to avoid damaging the connectors.
- When use the probe, avoid bending the twisted probe cable.
- Use qualified medical ultrasonic gel; avoid damage caused by inferior gel on the probe head.



**Warning:**

1. **When cleaning and disinfecting, the probe cannot be connected with the machine.**
2. **When cleaning and disinfecting, Immersed probe shall not exceed the joint line of head and handle.**

## ■ **Cleaning**

After using the probe, clean its surface with a soft waterlogged cloth.

If the probe is seriously polluted, firstly clean it with a soft cloth soaked with neutral cleaning fluid, then clear the cleaning fluid with a soft waterlogged cloth.

After cleaning, dry the probe with a clean dry soft cloth.



**Warning: Do not use alcohol or other organic solvents to clean the probe.**

**Notice:**

1. While cleaning, disinfecting or sterilizing any equipment, be sure to wear protective glasses and gloves.

## ■ **Disinfection or Sterilization**

The probe must be disinfected or sterilized with liquid chemical disinfectants, such as CIDEX, which should be mixed, stored and used according to the manufacturer's instructions.

The probe shall be immersed in disinfectant for no less than 20 minutes, but no more than 1 hour, the immersed part shall not exceed the probe joint line.

After sterilization, clean the disinfectant on the probe with water, and then wipe the probe with a dry soft cloth.



**Warning:**

**Do not use high pressure steam to disinfect the probe or contact it with the**

**ethylene oxide. Under no circumstances, can the thermal disinfection be used. It will damage the probe when the temperature exceeds 66 degrees. The probe cannot be completely immersed in liquid, and the immersed part shall not exceed the probe joint line.**

2. Clean the probe socket
  - Use a soft dry cloth to wipe the stains on the probe socket.
  - If there are still some stains difficult to remove, use a soft cloth soaked with neutral detergent to wipe, and then dry under air.
3. Clean the monitor
  - Use a soft dry cloth to wipe the stains on the screen;
  - If there are still some stains difficult to remove, use a soft cloth soaked with mild water to wipe, and then dry under air.
2. Clean control panels and shell
  - Use a soft dry cloth to clean the surface of the machine, or wipe the stains with a soft cloth soaked with neutral detergent. Then dry it with a soft cloth or under air.

### **10.1.2 Data Maintenance**

The data should be managed regularly. Back up the data to an external storage medium to ensure its security. For the data which has been backed up successfully, please delete the unnecessary data in the device in case of affecting system performance after long-term use.



**Warning: Data cannot be retrieved after deletion, please operate it carefully!**

## **10.2 Maintenance**

### **10.2.1 Maintenance by Operators**

After the completion of the operation, should be clean the probe on time.

It suggests cleaning the machine in each quarter. The maintenance includes the following contents:

1. Clean the whole machine.
2. Check whether all parts (e.g., monitors, panels, etc.) work normally or not.
3. Inspect the cracks on the probe components which are allowed to be immersed in conductive liquid.
4. Inspect the probe cables and other plugs.

### 10.2.2 Maintenance and Inspection by Maintainers

In order to ensure the system's performance and security, the following inspections must be performed. Please contact and consult the manufacturer while inspecting.

| Inspection Categories | Inspection Items                                                                                                                               |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Clean                 | Inner system<br>Peripheral devices                                                                                                             |
| Electrical safety     | The grounding impedance<br>The floor drain current<br>The shell leakage current<br>The animal leakage current                                  |
| Machinery safety      | Check installation parts of the monitor<br>The console<br>Peripheral equipment installation<br>Other mechanical components<br>Probe appearance |
| Image record          | The image of each mode                                                                                                                         |

### 10.3 Fault Inspection

In order to ensure proper operation of the machine, it is recommended that the operator make a maintenance and regular inspection plan to inspect the machine safety and performance regularly. Once an abnormality is found, please contact the manufacturer.

If there is no image after system boot, or there is menu display but no image, please refer to the following table. If the fault still cannot be ruled out, please contact the manufacturer.



**Warning : Don't spill water or liquid to the device when clean it. Otherwise, it may lead to failure or electric shock.**

Faults and troubleshooting table:

| Item | Fault description                                                     | Elimination method                                                   |
|------|-----------------------------------------------------------------------|----------------------------------------------------------------------|
| 1    | Switch on the power, but the power indicator light is not on.         | Check the power supply and cable to verify they work normally.       |
| 2    | Power light is on, but no image is displayed.                         | Restart the machine at least 5 minutes after shutdown.               |
| 3    | Discontinuous stripe and snowflake interferences are displayed on the | 1. Inspect the power supply to see whether it is interfered by other |

|   |                                                                                                     |                                                                                                                                                                                                  |
|---|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | screen.                                                                                             | equipment;<br>2. Environmental inspection, inspect whether there is electromagnetic interference around the machine;<br>3. Inspect whether the power and probe plug or outlet is well contacted. |
| 4 | No message on the screen, but there is operation noise; Images displayed on the screen are unclear. | 1. Adjust the TGC, GAIN:<br>2. Clean the screen surface ( use the dry, soft cloth to wipe the monitor screen).                                                                                   |
| 5 | After startup, images are displayed normally but the fan does not turn.                             | 1. It's dusty inside the fan. Use a brush to remove the dust.<br>2. The fan might be damaged, replace it with a new one.                                                                         |

## 10.4 Instructions of Equipment Modification

Under the conditions prescribed by law, the manufacturer reserves the right of product design and specification changes.

The instruction is inconsistent with the equipment, please in kind prevail!

## **11 Transport & Storage**

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The product should be put on upward direction during transport so as to prevent rain and mechanical impacts. The stack plies are no less than four piles. The product should be stored in a place with ultimate temperature of -20°C~55°C, the relative humidity 10%~95%, the atmospheric pressure 500hPa ~ 1060hPa, non-corrosive gas but good ventilation

## 12 Instruction of Sound Output

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This chapter is intended for the entire system (including the host, probes, accessories and peripherals), and aimed at providing information associated with sound output for the operator, as well as important safety information about how to control the irradiation time by ALARA principle.

Please read this chapter carefully before use.

### 12.1 Biological Effects

Ultrasound waves are generally regarded safe for diagnosis. There is no report about the human body damage caused by ultrasound waves so far. In spite of that, we still can't arbitrarily believe that all of the ultrasound waves are absolutely safe. Related studies have proven that high-intensity ultrasound waves are harmful to the body's tissues.

In recent years, with the long-term development of the ultrasonic diagnosis technology, people are more and more concerned about ultrasonic application and the potential risks of biological effects caused by diagnostic techniques.

### 12.2 Statement of Cautious Use

Although it is not clearly confirmed that using ultrasonic equipment will cause the body to produce a biological effect, still existence of biological effects might be proven in future applications. We must use ultrasound waves cautiously, realizing their clinical effects. On the premise of acquiring necessary clinical information, avoid using the high-intensity ultrasound waves for a long time.

### 12.3 ALARA Principle ( As Low As Reasonably Achievable )

When use the ultrasound waves, please follow the ALARA principle, On the premise of guarantee diagnostic information, use the lowest possible level of energy which will not lead to biological effects. Ultrasonic energy depends on the output intensity and irradiation time. Different patients and clinical case needs ultrasonic intensity is not the same.

Not all of these checks can be completed by outputting very low energy ultrasonic. Very low energy ultrasonic will only produce low-quality images and weak Doppler signal, thereby affecting the reliability of the diagnosis. However, Use the sound power which is greater than the actual need also do nothing to improve the quality of diagnostic information, but will increase the risk of biological effects.

The operator must be responsible for animal safety, purposefully using ultrasound, or select the output power of ultrasonic per the ALARA principle.

For additional information about the ALARA principle and the potential biological effects of ultrasound, see the file named *Medical Ultrasound Safety* published by American Institute of ultrasound medicine (AIUM).

## 13 Electromagnetic Compatibility (EMC)

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EMC refers to the fact that a product, a device or a system can work properly and doesn't cause unsustainable electromagnetic disturbance to any objects in its environment.

Anti - electromagnetic interference is the ability of the product, equipment or system to work normally in the presence of EMI.

The All-Digital Veterinary Ultrasound Diagnostic System is designed and manufactured according to the existing standards of electromagnetic compatibility and related requirements, Using the device in electro-magnetic field may cause performance changes or degradations like unstable output. If it happens frequently, it's suggested that the system's operating environment be examined to confirm the possible disturbance origins. Those disturbances may originate from other electrical devices in the same room or the room nearby, or from portable and mobile RF communication equipment like cell phones, interphones etc, or from radio equipment, TV or microwave transmission equipment. If the All-Digital Veterinary Ultrasound Diagnostic System is disturbed by EMI, it shall be moved to other places or relevant measures shall be taken to prevent the electromagnetic disturbance.

This device conforms to the requirements of the industry standard EN60601-1-2:2007.

### Note

- 
- The use of attachments, sensors and cables outside the prescribed scope may increase the electromagnetic emission and/or reduce the electromagnetic immunity of the equipment.
  - In addition to transducers and cables sold by the manufacturer of the equipment or system as spare parts for internal components, the use of non-prescribed accessories, transducers and cables may result in increased emission or reduced immunity of the equipment or system.
  - The device can not be used with other devices close to or stacked together. When necessary, observe this equipment closely to ensure that it functions properly in the configuration you are using.
  - It requires special protection against EMC of this equipment and need to be installed and maintained in an environment that meets the following EMC information.
  - Even if other equipment meets the launch requirements of the national standard, it may cause interference to the equipment.
  - When the input signal is less than the minimum range specified in the technical specification, it may result in inaccurate measurement.
  - Portable and mobile communication equipment can affect the performance of the equipment.
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**Explanation**

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- ◆ In the case of interference, the track ball of the All-Digital Veterinary ultrasonic diagnosis system will temporarily fail and become stuck, which is not considered as the basic performance requirement.
  - ◆ If you are operating and using an All-Digital Veterinary Ultrasound Diagnostic System in the electromagnetic environment described below under "Electromagnetic Immunity," it will work safely and provide the following basic capabilities:
    - 1) The keyboard works;
    - 2) Ultrasonic probe can be used to display ultrasonic image on the monitor.
- 

| Electromagnetic emission guidelines and statements                                                                                                                                      |                |                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This device should be used in the specified electromagnetic environment, customers or users should ensure that the equipment is used in the electromagnetic environment specified below |                |                                                                                                                                                                                       |
| Emission test                                                                                                                                                                           | Compliance     | Electromagnetic environment - Guidelines                                                                                                                                              |
| RF emission<br>CISPR11                                                                                                                                                                  | 1 group        | This device only uses RF energy when running its internal functions, so its RF emission is very low and there is little possibility of interference to the electronic devices nearby. |
| RF emission<br>CISPR11                                                                                                                                                                  | Class A        | This equipment is suitable for use in the facilities of non domestic and that are not directly connected to the public low voltage supply network for residential                     |
| Harmonic emission<br>IEC61000-3-2                                                                                                                                                       | Not applicable |                                                                                                                                                                                       |
| Voltage fluctuation and flicker<br>IEC61000-3-3                                                                                                                                         | Not applicable |                                                                                                                                                                                       |

**The approved annex which meets the electromagnetic standard:**

Accessories for All-Digital Veterinary Ultrasound Diagnostic System may affect their radiation levels. The accessories listed in this section have been tested in accordance with international standards for use in All-Digital Veterinary Ultrasound Diagnostic System and have been verified to meet radiation standards. Please use only the attachments listed in this section.

The user should ensure the electromagnetic compatibility of the All-Digital Veterinary Ultrasound Diagnostic System when attaching accessories to an All-Digital Veterinary Ultrasound Diagnostic System. Unless otherwise specified, use only EMC compliant equipment.

| Code | Name                 | Cable length ( m ) | Shielded or not |
|------|----------------------|--------------------|-----------------|
| 1    | AC Input power cable | 1.7                | N               |
| 2    | Power adapter cable  | 1.2                | N               |
| 3    | Probe cable          | < 2.5              | Y               |



### Warning

- This equipment is only used by professional medical staff. The equipment/system may cause radio interference or disrupt the operation of nearby equipment. Mitigation measures may be necessary, such as recalibrating the direction, resetting the device or shielding the appropriate site.

### Electromagnetic Immunity Guidelines and Statements

This device should be used in the specified electromagnetic environment, customers or users should ensure that the equipment is used in the electromagnetic environment specified below

| Immunity test                                                                                       | IEC60601 Testing electrical level                                                                                                                                      | Compliance level                                                                                                                                                         | Electromagnetic environment—Guide                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrostatic discharge<br>IEC61000-4-2                                                             | ±6 kV<br>Contact discharge<br>±8 kV Air discharge                                                                                                                      | ±6 kV<br>Contact discharge<br>±8 kV<br>Air discharge                                                                                                                     | The ground should be wood, concrete or tile, if the ground is covered with synthetic material, the relative humidity should be at least 30%.                                                                                     |
| Electrical fast transient burst<br>IEC61000-4-4                                                     | ±2 kV Power line                                                                                                                                                       | ±2 kV Power line                                                                                                                                                         | The network power supply should have the quality of a typical commercial or hospital environment.                                                                                                                                |
| Surge<br>IEC61000-4-5                                                                               | ±1 kV<br>Differential-Mode<br>±2 kV<br>Common-Mode                                                                                                                     | ±1 kV<br>Differential-Mode<br>±2 kV<br>Common-Mode                                                                                                                       | The network power supply should have the quality of a typical commercial or hospital environment.                                                                                                                                |
| Power input line voltage temporary drop, short - time interrupt and voltage change<br>IEC61000-4-11 | <5% $U_T$ (dropping more than > 95 % $U_T$ ) 0.5 cycle<br>40 % $U_T$ (dropping 60% $U_T$ ) 5 cycle<br>70 % $U_T$ (dropping 30% $U_T$ ) 25 cycle<br><5% $U_T$ (dropping | <5 % $U_T$ (dropping more than > 95 % $U_T$ ) 0.5 cycle<br>40 % $U_T$ (dropping 60% $U_T$ ) 5 cycle<br>70 % $U_T$ (dropping 30% $U_T$ ) 25 cycle<br><5 % $U_T$ (dropping | The network power supply should have the quality of a typical commercial or hospital environment. If the device needs to continue to run during the outage of the network power supply, we recommend uninterrupted UPS for power |

|                                                                                                      |                                     |                                     |                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                      | more than 95%U <sub>T</sub> )<br>5s | more than 95%U <sub>T</sub> )<br>5s | supply .                                                                                                                                               |
| power<br>frequency<br>magnetic fields<br>(50/60Hz)<br>IEC61000-4-8                                   | 3 A/m                               | 3 A/m                               | The labor frequency magnetic field should have the characteristic of the labor frequency magnetic field in typical commercial or hospital environment. |
| Notice 1: U <sub>T</sub> refers to the voltage of the AC network before the test voltage is applied. |                                     |                                     |                                                                                                                                                        |

| Electromagnetic Immunity Guidelines and Statements                                                                                                                                      |                                   |                  |                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This device should be used in the specified electromagnetic environment, customers or users should ensure that the equipment is used in the electromagnetic environment specified below |                                   |                  |                                                                                                                                                                                                                                                                                                                                                                        |
| Immunity test                                                                                                                                                                           | IEC60601 Testing electrical level | Compliance level | Electromagnetic environment—Guide                                                                                                                                                                                                                                                                                                                                      |
| Conducted Immunity<br>IEC61000-4-6                                                                                                                                                      | 3 Vrms<br>150k ~ 80MHz            | 3 Vrms           | <p>Portable and mobile radio frequency communication equipment must be used outside of the specified distance between the equipment and/or any part of the system (including the cable). This isolation distance is calculated according to the frequency of the emitter.</p> <p>The calculation formula of the proposed isolation distance is:</p> $d = 1.2 \sqrt{P}$ |

|                                   |                        |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radiated immunity<br>IEC61000-4-3 | 3V/m<br>80MHz ~ 2.5GHz | 3 V/m | <p>The calculation formula of the proposed isolation distance is:<br/> 80 MHz~800 MHz: <math>d = 1.2 \sqrt{P}</math><br/> 800MHz~2.5GHz : <math>d = 2.3 \sqrt{P}</math></p> <p>Among them, P is the maximum output rated power of the transmitter manufacturer provided by the transmitter manufacturer, and the unit is watt;<br/> D is the recommended distance, the unit is meter.The field intensity of RF emitters measured by electromagnetic fields must be less than the coincidence level in each frequency range.</p> <p>Interference may occur near equipment that marks the following symbols:</p>  |
|-----------------------------------|------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note 1: At 80MHz and 800MHz frequency, the formula of higher frequency band is adopted.

Note 2: These guide may not be suitable for all situations, and electromagnetic communication is affected by the absorption and reflection of buildings, objects and bodies.

\* Stationary transmitter field, such as wireless cellular/cordless phones and ground mobile radio base station, amateur radio, AM (amplitude modulation) and FM (frequency modulation) radio and television broadcasting, etc., the field intensity in theory can not be predict. In order to evaluate the electromagnetic environment of the fixed radio frequency transmitter, the investigation of electromagnetic field should be considered. If the field intensity where the equipment is measured is higher than that of the above application, the test should be verified to verify its normal operation. If abnormal performance is observed, additional measures may be necessary, such as redirection and resetting of the equipment.

\* In the all frequency range from 150KHz to 80MHz,the field intensity should lower than 3.7 V/m

### Recommend Distance between the device and the portable/mobile RF communication equipment

The equipment can be used in the electromagnetic environment controlled by RF interference. To avoid electromagnetic interference, the customer or user should maintain the minimum recommended distance between the device and the portable/mobile RF communication equipment.

| Transmitter<br>maximum rated<br>output power ( W )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Corresponding transmitter isolation frequency of different distances |                                       |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------|----------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 150 kHz~ 80 MHz<br>$d = 1.2 \sqrt{P}$                                | 80 MHz~ 800 MHz<br>$d = 1.2 \sqrt{P}$ | 800 MHz~ 2.5 GHz<br>$d = 2.3 \sqrt{P}$ |
| 0.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.12                                                                 | 0.12                                  | 0.23                                   |
| 0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.38                                                                 | 0.38                                  | 0.73                                   |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.20                                                                 | 1.20                                  | 2.30                                   |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3.80                                                                 | 3.80                                  | 7.30                                   |
| 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12.00                                                                | 12.00                                 | 23.00                                  |
| <p>For the transmitter rated maximum output power not listed in the table above, the recommended separation distance d, which the unit is meters (m), can be determined using the formula in the appropriate transmitter frequency column, P here is the transmitter manufacturer's transmitter maximum rated output work Rate, which use the watts (W) as unit.</p> <p>Note 1: At 80MHz and 800MHz frequency, the formula of higher frequency band is adopted。</p> <p>Note 2: These guide may not be suitable for all situations, and electromagnetic communication is affected by the absorption and reflection of buildings, objects and bodies.</p> |                                                                      |                                       |                                        |

## Annex A Declaration of Conformity with Good Practice for Pollution Control of Electronic Information Product

Product name and content of the toxic and hazardous substances

| Parts             | Toxic and hazardous substances or elements |        |        |          |         |          |
|-------------------|--------------------------------------------|--------|--------|----------|---------|----------|
|                   | ( Pb )                                     | ( Hg ) | ( Cd ) | ( Cr6+ ) | ( PBB ) | ( PBDE ) |
| Plastic Shell     | ○                                          | ○      | ○      | ○        | ○       | ○        |
| Metal Stent       | ○                                          | ○      | ×      | ×        | ○       | ○        |
| Silicone keyboard | ○                                          | ○      | ○      | ○        | ○       | ○        |
| Trackball         | ×                                          | ○      | ○      | ○        | ○       | ○        |
| Wire              | ×                                          | ○      | ○      | ○        | ○       | ○        |
| PCBA              | ×                                          | ○      | ○      | ○        | ○       | ○        |
| Hard disk         | ○                                          | ○      | ○      | ○        | ○       | ○        |

○: Indicates that the toxic and hazardous substances in all parts of homogeneous material are below the prescribed limit requirement in local standard.

×: Indicates that the toxic and harmful substances, at least in one part of a homogeneous material are beyond the prescribed limit requirement in local standard.

For the products on sale day, the table shows electronic information products by our company supply chain may contain these substances.

Notice: Sold products may or may not contain all of the listed parts.



**Warning: When the service life of the equipment is exceeded, all the wastes (used batteries, circuit boards, fragile electronic components, etc.) may cause harm. They should be disposed in accordance with local regulations, rather than disposed haphazardly.**

# Annex B Product Specification

## B.1 Product Classification

|                                     |                                                                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Type of electric shock proof        | Class I Internal power equipment                                                                                            |
| Degree of electric shock proof      | Type-B applied part                                                                                                         |
| Working Mode                        | Continuous operation                                                                                                        |
| Protection rating of liquid ingress | Host: IPX0 (Unprotected)<br>Probe: IPX7 (Protection against short-time ingress)                                             |
| Security degree of ignitable gas    | Not suitable to use the equipment in the presence of ignitable anesthesia gas mixed with the air (or oxygen, nitrous oxide) |
| Mobility Grade                      | Portable Equipment                                                                                                          |

## B.2 Power Supply

AC

|                  |                |
|------------------|----------------|
| Input Voltage    | AC 100V ~ 240V |
| Input Power      | 110VA          |
| Frequency        | 50Hz/60Hz      |
| Working Duration | Over 8hours    |

Battery

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| Battery Type          | Rechargeable lithium ion battery                   |
| Battery Specification | 10.89V/5200mAh                                     |
| Power-on Time         | Continuous working time: ≥1.5h                     |
| Power-off Delay       | ≥5mins ( Since the first time low battery alarms ) |

## B.3 Physical Specification

| Weight                                                               | Size ( L*W*H )    |
|----------------------------------------------------------------------|-------------------|
| Around 7.5kg ( Including host, Veterinary convex probe and adapter ) | 470mm×370mm×380mm |

## B.4 Hardware

### B.4.1 Monitor

|      |                           |
|------|---------------------------|
| Type | LED Backlight LCD Display |
| Size | 12.1 inches               |

#### **B.4.2 Device Interface**

|                   |   |                                                            |
|-------------------|---|------------------------------------------------------------|
| Probe Connector   | 2 | Connect with probes                                        |
| USB Port (A type) | 2 | Connect with USB disk to transfer data                     |
| USB Port (B type) | 1 | Connect with PC                                            |
| VGA Port          | 1 | Serial Port                                                |
| Video Port        | 1 | Connect with Video printer or B Ultrasound Working station |

#### **B.4.3 Indicator Light**

|                      |   |        |
|----------------------|---|--------|
| Working Light        | 1 | Green  |
| Battery Charge Light | 1 | Yellow |
| Power Alarm Light    | 1 | Red    |

#### **B.4.4 Audio Indication**

|             |                                      |
|-------------|--------------------------------------|
| Loudspeaker | Audio indication of pressing the key |
|-------------|--------------------------------------|