

Intellectual Property Rights

The intellectual property rights of the Operator's Manual and the corresponding product belong to Shenzhen BMV Technology Co., Ltd. (hereinafter referred to as "BMV").

This Manual contains proprietary information protected by copyright law. Without written permission of BMV, any organization or individual is prohibited to photograph, copy, modify or print any part of this Manual, or translate into other languages.

However, BMV is not liable for any incidental or consequential damages to the actual performance and use due to errors in the Manual or the provision of this Manual. BMV does not provide license conferred by patent law to any other parties. BMV does not assume legal responsibility for the legal consequences resulting from violating the patent law and the rights of any third party.

Statement

BMV reserves the right of final interpretation to this Manual.

The content of this manual is subject to change without prior notice.

Only if the following requirements are met, BMV will be responsible for the safety, reliability and performance of the product, i.e.:

- Assembly, expansion, re-adjustment, improvement and repair should only be performed by qualified personnel approved by BMV;
- All the replaced parts and supported accessories and consumables relate to the maintenance shall be originally from BMV or other approved by BMV;
- DO NOT make changes or modifications to the software or hardware of this system;
- The electrical equipment complies with relevant standards and the requirements of this Manual;
- The product is operated in accordance with this Manual.

After-sales Service Unit

Name: Shenzhen BMV Technology Co., Ltd. Customer Service Department

Address: 4/F, BMV of Yinjin Building, Block 71, Baoan Qianhai Center, Shenzhen, China

Post Code: 518100

Website: www.bmv.cc

Email: export@bm.cc

Tel: +86 75526564580

Fax: +86 75526564580-866

Preface

Notice

This User Manual is the necessary instruction for the safe use of this product. This Manual introduces the use, properties, method of operation, safety information and intended use of the BestScan series ultrasound system in details. Before using the product, please carefully read and understand the contents of this Manual, and abide by the method of operation stated in the Manual in order to ensure the safety of patients and operators.

This User Manual is a major component of the product, and should always be placed near the product for easy reference.

Object of Application

This User manual is intended for professional clinical staff or personnel with experience in the use of ultrasound diagnostic equipment. The readers should have knowledge and work experience in medical procedures, practices and terminology of ultrasound diagnosis.

Illustration

All the illustrations in the user Manual are for reference only. The menus, setting and parameters of the Illustrations may be different from your actual currently use system. The content varies depending on the software version, preset setting and optional configuration.

Table of Contents

CHAPTER 1 INTRODUCTION	1
1.1 SCANNER OVERVIEW	1
1.1.1 Multi Language Support	1
1.1.2 Probe	1
1.2 INTENDED USE	2
1.3 IMAGE MODE	2
1.4 PERIPHERAL DEVICES	2
1.5 MEASUREMENT	2
CHAPTER 2 SAFETY AND CARE	3
2.1 SAFETY INSTRUCTIONS	3
2.1.1 Symbols	3
2.1.2 Labels	4
2.1.3 Biohazard Considerations	5
2.1.4 Electrical Safety	5
2.1.5 Electromagnetic compatibility	6
2.2 CARING FOR THE SYSTEM	8
2.2.1 Daily Checklist	8
2.2.2 Maintenance	9
2.2.3 Cleaning and Disinfection	10
2.3 CARING PROBE	11
2.3.1 Cleaning and Disinfecting Probe	11
2.3.2 Storage	12
2.3.3 Repair	12
2.3.4 Protective Case	12
2.4 CARING COUPLING AGENT	12
2.5 BATTERY	12
2.5.1 Battery charge and discharge	13
2.5.2 Battery storage	13
2.5.3 Battery Replacement and Disposal	13
CHAPTER 3 SYSTEM CONTROLS AND DISPLAYS	14
3.1 OPERATION PANEL	14
3.2 OPERATION INTERFACE	15
CHAPTER 4 EQUIPMENT OPERATION	18
4.1 INITIAL SETTINGS	18
4.1.1 Daily Inspection	18
4.1.2 System Review	18
4.2 STARTUP	19
4.2.1 System Charge	19
4.2.2 System Startup	20
4.2.3 Connection and Disconnection of the Probe Connector	20
4.2.4 Input / Output Port Board	21
4.2.5 Environment for Use	21
4.2.6 Instrument Debugging	21
4.3 MAIN MENU SETTINGS	22
4.3.1 General Settings	22
4.3.2 Image preset	24
4.3.3 Measurement settings	25
4.3.4 Version	27
4.4 FREQUENCY SELECTION	27
4.5 NEW PATIENT	27
4.6 OPERATING MODE	28
4.6.1 B Model	28
4.6.2 2B Mode	28
4.6.3 4B Mode	29
4.6.4 B/M Mode and M Mode	29
4.7 ADJUSTMENT OF IMAGE PARAMETERS	29
4.7.1 Adjusting the Gain	29
4.7.2 Changing the Dynamic Range	29
4.7.3 Setting Frame Correlation	30
4.7.4 Setting Edge Enhancement and Image Smoothing	30

4.7.5 Setting Gray Scale	30
4.7.6 Adjusting the Focus	30
4.7.7 Changing Imaging Depth	31
4.7.8 Changing Colorize	31
4.7.9 Screen Flipping	31
4.7.10 Touch screen calibration.....	31
4.8 CINE PLAYBACK.....	31
4.9 IMAGE MANAGEMENT AND PRINT	32
4.9.1 Image Storage and Reviewing.....	32
4.9.2 Image Transfer	33
4.9.3 Print.....	34
CHAPTER 5 MEASURING AND REPORTING	35
5.1 MEASUREMENT OVERVIEW.....	35
5.2 GENERAL MEASUREMENT - B MODE	35
5.2.1 Distance Measurement	35
5.2.2 Area / Circumference Measurement	36
5.2.3 Volume Measurement.....	37
5.2.4 Angle Measurement.....	38
5.2.5 Histogram Measurement	39
5.3 GENERAL MEASUREMENT - M MODE.....	39
5.3.1 Heart Rate	39
5.3.2 Slope	40
5.3.3 Time.....	40
5.4 CANINE MEASUREMENT	41
5.4.1 Methods of Canine measurement.....	41
5.5 FELINE MEASUREMENT.....	41
5.6 OVINE MEASUREMENT	41
5.7 BOVINE MEASUREMENT	42
5.8 EQUINE MEASUREMENT	42
5.9 PIG MEASUREMENT	42
CHAPTER 6 TECHNICAL SPECIFICATIONS	44
6.1 TECHNICAL PARAMETERS	44
6.2 SYSTEM REQUIREMENTS	46
6.2.1 Power Requirements	46
6.2.2 Peripherals.....	46
6.2.3 Operating Environment Requirements.....	46
6.3 TRANSPORT AND STORAGE	46
6.3.1 Requirements of Transport & Storage	46
6.3.2 Transport of the Unit	46
6.3.3 Transport of Probe	46
6.4 DISPOSAL OF PACKAGING	47
6.5 LOSS STATEMENT	47
6.6 DESCRIPTION OF ELECTROMAGNETIC INTERFERENCE	47

Chapter 1 Introduction

1.1 Scanner Overview

BestScan S6 is a handcart -type digital ultrasound diagnostic scanner. S6 is composed of main unit, monitor, ultrasound probe and related parts. The scanner adopts advanced beam forming and image processing technologies. The scanner software supports B-mode, M-mode, B/B-mode, 4B-mode, B/M-mode, M-mode imaging, measurements, markers, annotations, reports, image storage and management, biopsy guideline function and so on.

1.1.1 Multi Language Support

The system application software and control panel overlays support English, Chinese, Portuguese, Turkish, Spanish and Italian

Model	Type	Description	Configuration
65EL70S	Rectal Linear Probe	Center Frequency : 7.5 MHz L=50mm	Standard
75EL50S	Rectal Linear Probe	Center Frequency : 7.5MHz,L=50mm	Optional
35RC60H	Rectal Convex probe	Center Frequency : 3.5 MHz, R=50mm	Optional
75L50S	Linear Probe	Center Frequency : 7.5 MHz, R=50mm	Optional
35C60H	Convex Probe	Center Frequency : 3.5 MHz, R=60mm	Optional
65C15S	Micro-Convex Probe	Center Frequency : 6.5 MHz, R=15mm	Optional

1.1.2 Probe

Probe is the application of the system. One probe can be connected to the ultrasound imaging system.

1.2 Intended Use



Note: This setup is only intended for doctors or professionals, or used under the guidance of doctors.

The BestScan S6 digital ultrasound diagnostic system supports the following application:

- Canine
- Feline
- Ovine
- Bovine
- Equine

1.3 Image Mode

- **B-mode:** B-mode is the default setting. When the system is powered on, the image screen displays in B-mode.
- **B/B-mode:** The B/B mode creates side-by-side images from one B mode image. The two images are simultaneously real-time or frozen.
- **B/M-mode:** B/M-mode displays a B image mode and an M-mode sweep.
- **M-mode:** Full screen M-mode display is available.

1.4 Peripheral Devices



Note: Peripheral devices shall be specified by BMV for use with the F40 ultrasound system or shall comply with the requirements specified in EN 60601-1 and EN 60601-1-1. Any use of other devices with the system is at the user's risk.



Note: For detail information about operations of these devices, refer to their operating instructions of the manufacturers.

1.5 Measurement

The measurement function is arranged by exam type and is available for use with all exam type (Canine, Feline, Ovine, Bovine, and Equine).

Chapter 2 Safety and care
















2.1 Safety Instructions

Do not operate the ultrasound imaging system until you fully understand the safety considerations and procedures presented in this manual.

2.1.1 Symbols

Table 2-1 is provided for your identification of important symbols located in labels on the ultrasound imaging system and probes.

Table 2-1 Scanner symbols

Symbol	Description
	Alternating Current
	AC (alternating current)voltage source
	DC (direct current) voltage source
	class II
	Type BF applied part
	Protected against the effects of temporary immersion in water
	TV video output
	Power "ON" (backup power)
	USB port
	Trademark of BMV
	Date of manufacture
	Manufacturer
	Indicates separate collection for electrical and electronic equipment in compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive
	See operating instructions
	General warning, caution, risk of danger

2.1.2 Labels

Figure 2-2 The back view of ultrasound scanner

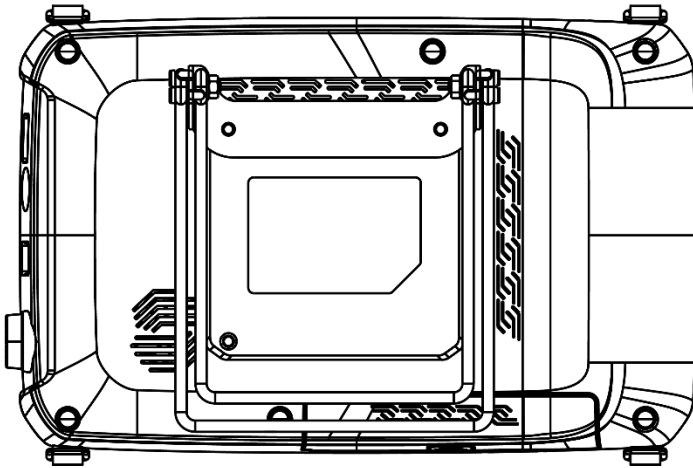


Figure 2-3 Identification Label



2.1.3 Biohazard Considerations

When using the system, please pay attention to the following biosafety-related points:



Caution: BMV makes every effort to manufacture safe and effective probes. You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. These precautions should be considered in the use of any application that may indicate the need for such care, and during endocavity scanning; during biopsy or puncture procedures; or when scanning patients with open wounds.



Caution: To eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials, handle dangerous or infectious materials all along according to the medical specifications for handling biohazard castoffs.



Caution: To ensure the safety of examined patients, do not scan the same part of an examined patient consecutively for a long period of time.



Caution: When making ultrasonic scanning, the instrument shall be used with ultrasound coupling agent, and no biologic compatibility problem is found. However, to ensure safety, only qualified ultrasound coupling agent in compliance with related standard shall be used.



Caution: To ensure the safety of examined patients, do not scan the same part of an examined patient consecutively for a long period of time.



Caution: When making ultrasonic scanning, the instrument shall be used with ultrasound coupling agent, and no biologic compatibility problem is found. However, to ensure safety, only qualified ultrasound coupling agent in compliance with related standard shall be used.



Caution: Do not use the system if irregular and unusual repeated video refreshes occur. Discontinuous scanning frequency is a hardware fault, please remove it before use.

2.1.4 Electrical Safety

The system is designed in line with the safety standard of EN 60601-1, and use Type B isolation for the patient part. To ensure safety to the greatest extent, please pay attention to the following Cautions:



Caution: Improper ground of the instrument may result in the danger of electric shock. The only means to prevent electric shock is to use three-phase cable and plug. The power cable shall be inserted into a grounded socket, and the ground wire should not be moved away or removed.



Caution: Only cable hooks provided by BMV can be used.



Caution: Do not attempt to modify the instrument. If it is really necessary to do so, please notify us or our agent.



Caution: Operators of the instrument shall be qualified service-trained professionals or shall use the instrument under the supervision of qualified professionals.



Caution: To make electrical or mechanical connection between this instrument and the

equipment of other manufactures, confirm that it complied with the IEC60601-1-1 standard, and recheck the leakage current and other safety indices of the entire set of system, to avoid possible hazard arising from leakage current overlapping.



Caution: Upon the expiration of the service life of the system, please notify your dealer or BMV to handle properly.



Caution: To avoid electrical shock and damage to the ultrasound system, turn off and unplug the equipment from the AC power outlet before cleaning and disinfecting.



Caution: Do not open the enclosure of this unit, as some components inside it carry high voltages that may cause hazards. If it is really necessary to do so, please contact your dealer or BMV to handle properly.



Caution: Do not use the instruments in an environment with combustible gases or anesthetic to avoid explosions.



Caution: Do not pour any fluid onto the system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.



Caution: This unit must be serviced once every 12 months to ensure its safety and functionality. Electric safety test must be performed at periodic intervals according to the local safety regulations or as needed.



Caution: To avoid the possibility of static shock and damage to the instrument, avoid the use of aerosol spray cleaners on the monitor screens.



Caution: The power supply of the instrument can only be connected to a special power interface. Never connect an unspecified device to the port of this instrument. Pay attention to correct connection of the grounding wire; otherwise, electric shock may easily occur.



Caution: Do not use the system in damp or wet environments. Keep it away from inflammables and explosives.



Caution: First check this unit and its parts every time before you use it. Timely replace any components with sign of damage.



Caution: Use the probe with care. Do not use damaged probes. Do not use probes with cracks or surface crimps, since such probes might have their insulation damaged, which easily causes electric shock to patients.

2.1.5 Electromagnetic compatibility

Portable Ultrasound Diagnostic Scanner has passed the tests that confirmed its compliance with electromagnetic compatibility (EMC) requirements of IEC 60601-1-2. It is CISPR 11: Group 1 Class A.



Caution: Special EMC requirements are imposed on medical equipment. The following should

be taken into account when installing and operating such equipment.

Strong electromagnetic fields induced over the air or the wires by portable and mobile communication devices or powerful sources of radio-frequency emission can cause failures in Portable Ultrasound Diagnostic Scanner operation. Such failures are manifested in impaired quality of ultrasound images produced by the system or in distortion thereof, in distortion of measurement results, instability of the system operation and other abnormal manifestations.

In the event that such disturbance is detected when operating the system, its source shall be localized and the following measures shall be taken.

- To detect the disturbance source, disconnect the nearby devices and turn them on again.
- Having detected the interference-emitting device, relocate or re-orient it.
- Increase the separation distance between the interference emitting device and Portable Ultrasound Diagnostic Scanner.
- Do not use the equipment with operating frequencies close to frequencies of Portable Ultrasound Diagnostic Scanner.
- The personnel in charge of monitoring the medical devices shall be trained to identify potential problems associated with electromagnetic emission.
- Use of cellular phones and computers shall be restricted in the areas where interference-sensitive devices are located.
- Electromagnetic emission shall be removed or eliminated technically, for example, through shielding.



Caution: Use of probes, cables and accessories other than stated in the operational documentation can entail RF emission enhancement or degradation of Portable Ultrasound Diagnostic Scanner stability.



Declaration: All cables, probes and other accessories, whose compliance with requirements of IEC 60601-1-2 – EMISSION and 36.202 – IMMUNITY is declared by the manufacturer.

Preferable operation conditions and electromagnetic compatibility levels of Portable Ultrasound Diagnostic Scanner are given in Tables 1-2, 1-3.

The system is designed to be operated in the below electromagnetic environment.

Table 2-4 EMISSION

EMISSION (EN 60601-1-2:2001+A1:2006)	
Test Type	Basic Standard
Mains terminal disturbance voltage	EN 55011:1998+A1:1999+A2:2002
Radiated disturbance	
Harmonic current emissions	EN 61000-3-2:2006
Voltage fluctuations & flicker	EN 61000-3-3:1995+A1:2001+A2:2005

Table 2-5 IMMUNITY

IMMUNITY (EN 60601-1-2:2001+A1:2006)	
Test Type	Basic Standard
Electrostatic discharge immunity	EN 61000-4-2:1995+A1:1998+A2:2001
Radiated, radio frequency electromagnetic field immunity	EN 61000-4-3:2006
Electrical fast transient/burst	EN 61000 4-4:2004
Surge immunity	EN 61000-4-5:2006
Immunity to conducted disturbances Induced by RF fields	EN 61000-4-6:1996+A1:2001
Voltage dips and short interruptions immunity	EN 61000-4-11:2004
Power frequency magnetic field immunity	EN61000-4-8:1993+A1:2001

2.2 Caring for the System

It is the responsibility of the user to verify that the ultrasound system is safe for diagnostic operation on a daily basis. Each day, prior to using the system, performs the steps of the Daily Checklist.

All exterior parts of the system, including the control panel, keyboard and probe, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect the components to kill vegetative organisms and viruses.

2.2.1 Daily Checklist

Complete the following each day before using the system:

- Visually inspect all probes. Do not use a probe which has a cracked, punctured, or discolored casing, or a frayed cable.
- Visually inspect all power cables. Do not turn on the power if a cable is frayed or split, or shows signs of wear. Contact your dealer for replacement of the power cable if a cable is frayed or split, or shows signs of wear.

Once the system is powered on:

- Visually check the on-screen displays and lighting.
- Make sure the monitor displays the current date and time.
- Verify that the probe identification and indicated frequency are correct for the active probe.

2.2.2 Maintenance



Note: To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electric safety test must be performed at periodic intervals according to the local safety regulations or as needed.

Repair:

For the repair or replacement of system equipment parts, please contact BMV or your dealer.

BMV Authorized Care:

Installers and operators must observe any statutory regulations that govern the installation, operation, inspection and maintenance of this equipment.

To ensure the safety of patients, operators, and third parties, you must check this equipment every 12 months, and replace any component if necessary. This maintenance must be performed by a qualified BMV authorized representative. It is important to inspect the equipment more frequently if it is operated under extraordinary conditions.

Check and maintenance must be performed at specified intervals to avoid any part becoming hazardous due to wear. Contact the BMV service department for information regarding the required maintenance.

As manufacturers and installers of ultrasound equipment, BMV cannot assume responsibility for the safety properties, reliability, and/or performance of the equipment if:

- Installations, extensions, readjustments, modifications, additions, or repairs are carried out by persons not specifically authorized by BMV.
- Components that affect the safe operation of the system are replaced by parts not authorized by BMV.
- The electrical installation of the room where the equipment is located does not meet the power and environment requirements specified in this manual.
- The equipment is not used in accordance with the operation instructions.
- The system is operated by persons who do not receive good education or training.

BMV suggests that you request any person that performs maintenance, or repairs, to provide you with a certificate showing:

- The nature and extent of the work performed
- Changes in rated performance
- Changes in working ranges

- Date of service
- Name of the person or firm performing the service
- Signature of the person performing the service

BMV refuses any responsibility whatsoever for repairs performed without the express written consent of the BMV.

2.2.3 Cleaning and Disinfection

You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. Use universal precautions when cleaning and disinfecting. You should treat all portions of the ultrasound system that come in contact with blood or other body fluids as if they were known to be infectious.

All exterior parts of the system, including the control panel, keyboard and probe, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect the components to kill vegetative organisms and viruses.

Cleaning and Disinfecting the System:



Note: To avoid electrical shock and damage to the ultrasound system, always power off and disconnect the equipment from the AC power source before cleaning and disinfection.



Note: Do not pour any fluid onto the system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.



Note: To avoid the possibility of static shock and damage to the system, avoid the use of aerosol spray cleaners on the monitor screens.

To clean the system surfaces:

1. Power off the ultrasound system and disconnect it from the power source.
2. Use a clean gauze pad or lint-free cloth, lightly moistened with a mild detergent, to widen the surface of the ultrasound system. Take particular care to clean the areas near the trackball and the slide controls. Ensure these areas are free of gel and any other visible residue.
3. After cleaning, use a clean, lint-free cloth to dry the surface.
4. After cleaning, reconnect the ultrasound system to the power supply. To remove and clean the holders for probes and coupling agent (gel):

Use neutral cleaning agent to clean the surfaces of the holders for probes and coupling agent, and then use a piece of lint-free cloth to dry them.

To clean the trackball:



Note: Do not drop or place foreign objects inside the trackball assembly. This may affect the trackball's operation and damage the system.

2.3 Caring Probe



Note: Ensure surfaces of the probe are always disinfected during procedures requiring disinfection.



Note: To minimize the risk of cross contamination and infectious diseases, endocavity and intraoperative probes must be cleaned and high-level disinfected after each use.



Note: The outer surfaces of an endocavity or intraoperative probe should be checked to ensure there are no unintended rough surfaces, sharp edges, or protrusions that may cause a safety hazard.



Note: Probes are sensitive devices irreparable damage may occur if they are dropped, knocked against other objects, cut, or punctured. Do not attempt to repair or replace any part of a probe.



Note: Do not use probe sheaths containing oil-based coatings or petroleum- or mineral oil-based ultrasonic coupling agents. Use only water-based ultrasonic coupling agent.



Note: Take extreme care when handling or storing probes. They must not be dropped, jarred, or knocked against other objects. Do not allow probes to come into contact with any sharp-edged or pointed object.

2.3.1 Cleaning and Disinfecting Probe



Note: To avoid electrical shock and damage to the system, disconnect the probe prior to cleaning or disinfecting.



Note: Do not sterilize probes using hot steam, cold gas, or Ethylene Oxide (ETO) methods. Before applying any other methods which might be recommended by manufacturers of sterilization equipment, please contact your supplier.



Note: Do not use abrasive cleaning agents, organic solvents such as benzene, isopropyl alcohol, or phenol-based substances, or cleaning agents containing organic solvents to clean or disinfect probes. These substances can damage the probes.



Note: Do not use a spray cleaner on a probe, as this may force cleaning fluid inside the housing and damage the probe.



Note: All probes should be cleaned and disinfected prior to their use on each patient. Endocavity and intraoperative probes require high-level disinfection prior to use.

- Cleaning and disinfecting probe:

1. Disconnect the probe from the system.
2. Moisten a clean gauze pad with water and wipe the probe to remove any gel or particles remaining on the probe. If water is not effective, you may use a pre-enzyme cleaner.
3. Carefully wipe the entire probe, including the cable and connector.
4. To disinfect the probe, take care to keep the cable strain relief and connector of the probe dry while immersing the probe in an approved disinfectant.
5. Carefully follow the disinfectant manufacturer's instructions.

6. After cleaning or disinfecting, use a clean cloth to dry the probe.

- To high-level disinfect a probe

1. Disconnect the probe from the system.

2. Thoroughly clean, rinse, and dry the probe.

3. Take care to keep the cable strain relief and connector of the probe dry while immersing the probe in an approved disinfectant to the level indicated in the following illustration see Figure 2-5.

4. Carefully follow the manufacturer's instructions for high-level disinfection.

5. After high-level disinfecting, use a clean cloth to dry the probe.

2.3.2 Storage

Store the probes in a clean and dry environment. Extreme temperature or humidity may damage the probes.

2.3.3 Repair

Do not attempt to repair or alter any part of the probe. Contact your supplier if a probe appears to be damaged or malfunctions in any way.

2.3.4 Protective Case

Due to the mechanical sensitivity of probes, BMV recommends that you always use the probe case when you ship a probe or transport it from one place of examination to another. The case is specially designed to protect the sensitive parts of the probe. Be sure that all parts of the probe are properly placed inside the case before you close the lid.

2.4 Caring Coupling Agent



Note: Before use, examine the coupling agent for any material flaws. Thinning, bulging, or brittleness of the material indicates damage. Any product showing flaws should not be used.

Do not store coupling agent below 5°C nor above 57°C. Coupling agent has a limited shelf life. Before use, examine these products for any material flaws. Some packaging may list an expiration date. Any product showing flaws, or whose expiration date has passed, should not be used.

2.5 Battery



WARNING: Do not strike or drop the battery because this can cause heat generation, bursting, or fire. Compromising the structural integrity of the battery pack can result in leakage or explosion and the potential for personal injury.



WARNING: Do not use the battery if it leaks fluid or has changed shape. If skin or clothing comes in contact with fluid from the battery, thoroughly wash the area immediately with clean water. If any fluid comes in contact with a user's eyes, immediately flush their eyes with water and seek medical attention.



WARNING: Do not allow the battery to contact water. Compromising the structural integrity of the battery pack can result in leakage or explosion and the potential for personal injury.



WARNING: Do not disassemble the battery. Compromising the structural integrity of the battery can result in leakage or explosion and the potential for personal injury.

2.5.1 Battery charge and discharge



Note: This battery can applicable for car charge. Please use BMV company standard charger or adapter to charge .otherwise may damage the battery.



Note: Do not place the battery on the charger when the power is full for a long time. Abnormally charge will result in heating, bursting, deformation or fire.



Note: when system use the battery power alone, you should promptly charge when the indicator of battery turns to red color.

- Battery normally charge time is 6~8h;
- Battery normally discharge time is 90~120min.

2.5.2 Battery storage



Note: The battery must be stored indoors in a clean, dry and well-ventilated area, which the environment temperature between 0°C~45°C Relative humidity below 75%.

The battery should be charged every six months. The voltage keep between 11.1V~11.85V.

2.5.3 Battery Replacement and Disposal

Replace the battery when it is no longer hold a charge. When system frequently use the battery power. Replace the battery every 12 to 18 months.



Note: Never dispose of a battery by burning or by flushing into any waste water system, for example, a lavatory. Compromising the structural integrity of the battery pack can result in leakage or explosion and the potential for personal injury.



Note: Collect and dispose of used battery separate from other waste. Do not throw into trash.

The battery pack should be recycled according to local, state and federal regulations. Use a battery collection program available in your country to dispose of the battery.

Chapter 3 System Controls and Displays

3.1 Operation Panel



Power

Press the button to turn on or off the system power.



Depth

In real-time status, press the button to adjust the imaging depth.



Focus

In real-time status, press the button to move up or down the focus point.



Freeze

Press this button to freeze the image on the screen. If the image or scanned image is frozen, press the button to resume the real-time imaging. When the image is frozen, the Freeze button will be flashing.



OK and Direction

Press ▲ ▼ to select the menu; Press ► ◀ to change the menu settings, and press OK to confirm.

3.2 Operation Interface

Figure 3-1 Layout of operation interface



1. Company logo: click it to enter the system settings;
2. Direction indications: the direction indications indicate the probe direction, which correspond to the small protrusions on the probe handle;
3. Operation menu;
4. USB and battery indications: After inserting the U disk, if the U disk can be recognized by the system, this indication will appear, prompting that the U disk is available;
5. System date and time display;
6. Thumbnail images: Display areas for image saving and measurement information;
7. Gray-scale bar;
8. Focus;
9. Vertical scale: indicating that the vertical distance of the image (the distance between points is 10 mm), and the scale will be changed with the image magnification;
10. Options: to flip, enlarge, or delete images, pop-up the U disk, and open the saved images;
11. Depth and frame rate values ;
12. Image display area;
13. Cine indicator;

14. Image parameter area: including total gain (Gain), Near gain(Near-Gn),far gain(Far-Gn),dynamic range (DR), frame correlation (FC),And probe information (displaying theprobe name and current operating frequency);
15. System information: Hospital name, Patient ID, operating mode operating status and Probe type.

Chapter 4 Equipment operation

4.1 Initial Settings

After unpacking and assembling the ultrasound diagnostic unit, you should verify the operations of the system.

4.1.1 Daily Inspection

Before using the ultrasound system every day, perform the steps set forth in the Daily Checklist (see Section 2.2.1).

4.1.2 System Review

Figure 4-1 Front view of the system

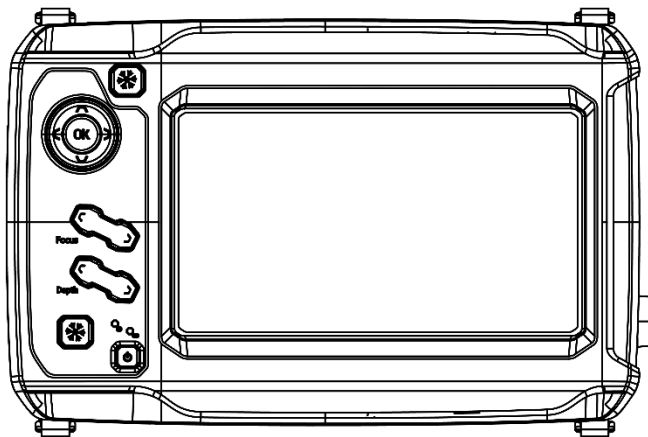


Figure 4-2 Right view of the system

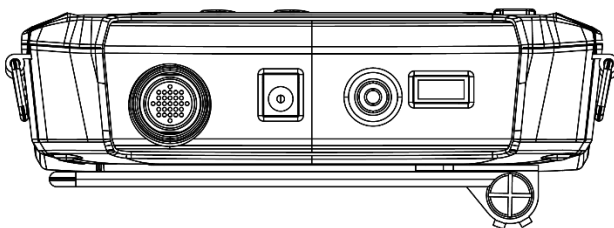
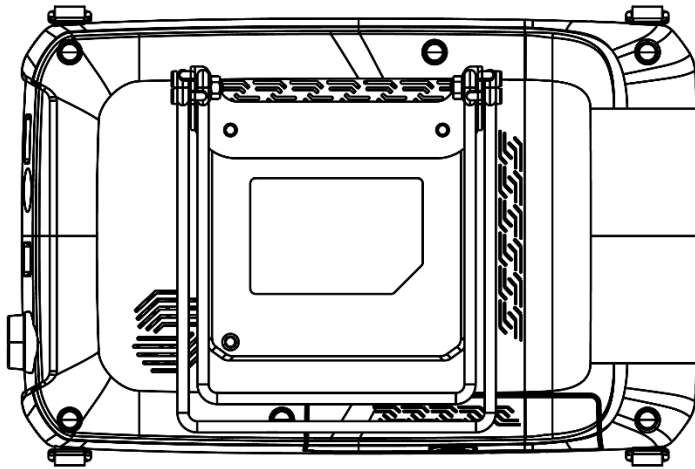


Figure 4-3 Back view of the system



4.2 Startup

4.2.1 System Charge

The system cannot connect with AC power directly, but through the adapter power connect with AC power and machine, provide batteries or working voltage for the system. The adapter with standard model is SNP-A048-M., the operating method of battery installation and connection of power cable of the adapter as follows:

1. Install the battery properly to the battery jar;
2. Plug one end of the adapter into the power input port (see Figure);
3. Connect the power cable of the adapter with the mains power supply;

At this point, regardless of whether the diagnostic unit is in operation, if the AC indicator is on and the charge indicator is flashing, the battery of the unit is in charged state.

Figure 4-4 Battery installation




Figure 4-5 connection of power cable of the adapter



4.2.2 System Startup



Press  , after the boot screen appears, wait a few seconds, and the system will enter the default mode.



Note: Wait about 30 seconds after powering off the system, and then turn on the power so that the system can complete the discharge process.

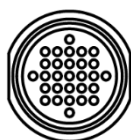
4.2.3 Connection and Disconnection of the Probe Connector



Note: Before connecting and disconnecting the probe connector, make sure the system is frozen or powered off.

On the right of the system, there is a port for the probe connector.

Figure 4-6 Sockets for the probe



Note: When the probe connector is connected to or disconnected from the system, certain resistance could be met with due to the internal special connector shielding materials, which is normal for the probe.

- Connecting the probe connector:

When plugging the connector into the socket, make sure the concavity of the probe port is aligned with the adjusting needle on the right, and the connector shall be adjusted till the lock set of the probe connector can be rotated clockwise so that it is locked in place, through which the connection can be properly fixed and kept in optimal contact state.

- Disconnecting the probe connector:



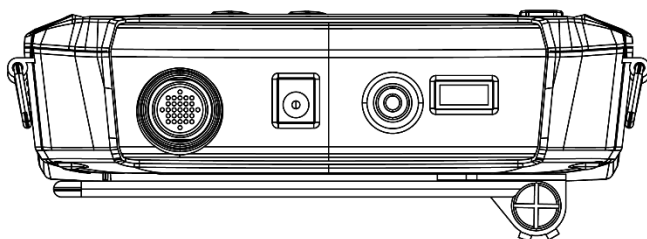
Note: Before connecting or disconnecting the probe, be sure to freeze the system. To avoid damaging the probe cable, do not disconnect the probe by pulling the cable. Please observe the following instructions.

1. Counter-clockwise rotate the lock set of the connector until it is unlocked;
2. Firmly grasp the probe connector and carefully unplug it from the socket;
3. The probe shall be respectively placed in their protective shipping boxes.

4.2.4 Input / Output Port Board

Video and communication connections are set on the input / output port board, which is located on the back of the ultrasound unit.

Figure 4-7 Input / Output panel



USB port

TV-OUT (composite video port)

Power cable port

Probe port

You need to connect a USB mouse to the system for operating BestScan S6.

4.2.5 Environment for Use

The unit shall be kept away from the electric field, magnetic field devices and high-voltage equipment. Avoid direct sunlight to the LCD, the indoor room should be dark in order to facilitate image viewing and maintain ventilation and dust prevention.

4.2.6 Instrument Debugging

The unit can be normally used without debugging required after being properly connected.

4.3 Main Menu Settings

The preset function of the system is used to set the unit's operating environment and status, and the preset values are stored in the unit's memory, which will not be lost in case of power failure, so as to ensure the unit will automatically perform the operating status to the user's expectations upon each start-up. The function of resetting the default values allows you to keep the parameters of the unit back to factory settings.


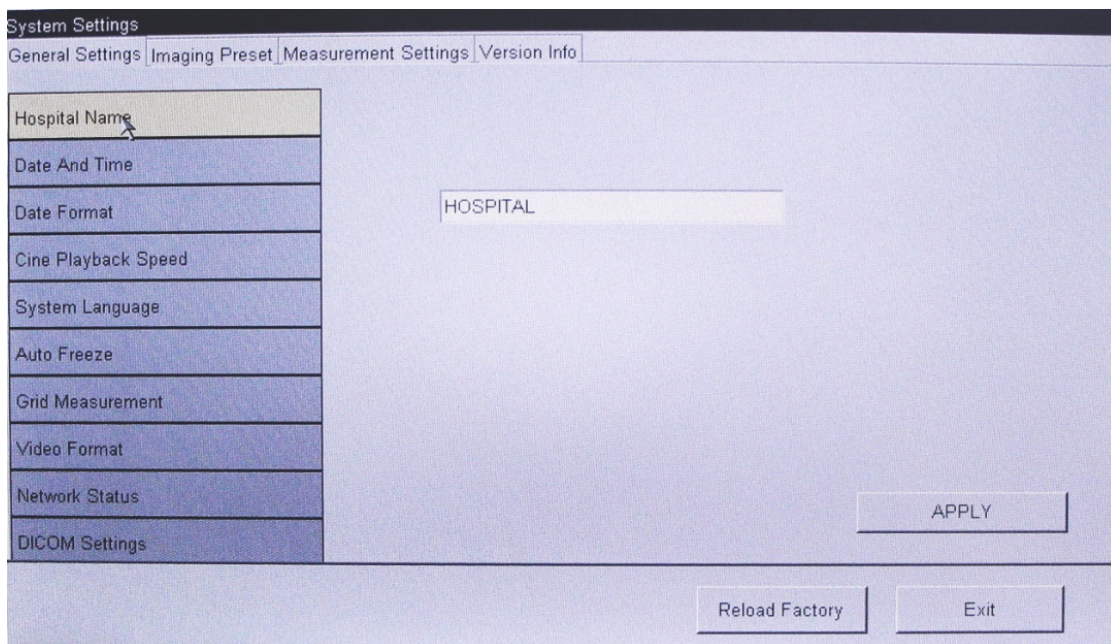
Click  on the top right of the screen to enter the system settings. The Main Menu Settings will be displayed on the screen, and the system defaults to the menu of General Settings.

Figure 4-8 System settings



The setting items under the main menu include:

General settings

Image Preset

Measurement settings

Version information

4.3.1 General Settings

The general settings include hospital name, the system time setting, date format setting, cine playback speed, system language selection, automatic freeze and Grid measurement setting.

4.3.1.1 Hospital name Setting

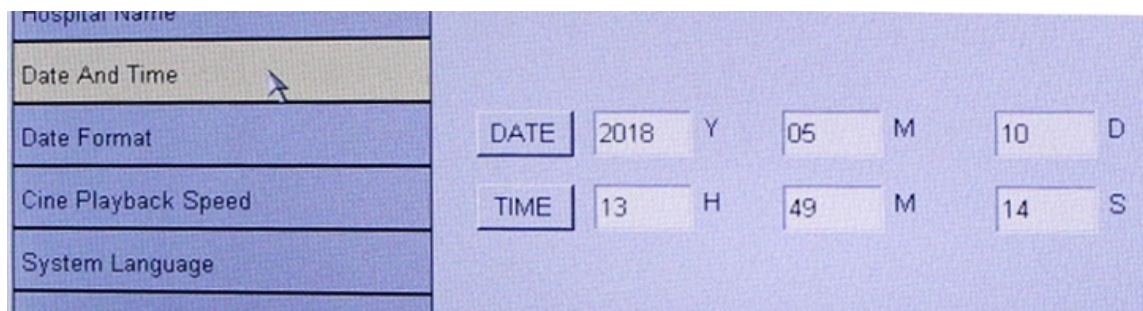
Click the [hospital name] button, turned up the hospital name Menu input items, we need connect the machine with a USB keyboard to input the hospital name.

4.3.1.2 System Time Setting

Click [Date and Time], Then click the [Date] button to pop-up the date setting box, click ►◀ to select the desired year / month, and then click on the required date; click [OK] to confirm the selected date and exit the date setting box. Click [Apply] to save the date settings, and click to [Exit] to return to the system operation interface.

Click the [Time] button to pop-up the time setting box. Click on the hour / minute /second input box that needs to be changed, and press the direction keys of [▲][▼] to select the time, click [OK] to confirm the selected time and exit the time setting box. Click [Apply] to save the time settings, and click [exit] to return to the system operation interface.

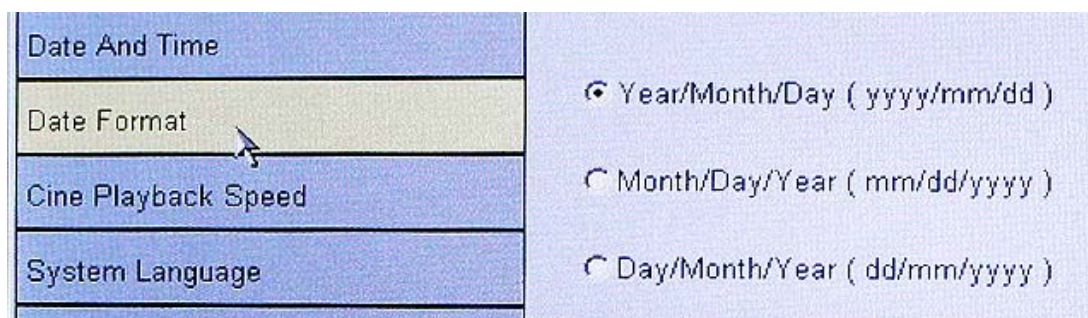
Figure 4-9 System time settings



4.3.1.3 Date Format Settings

Move the cursor to the date format options and click it to pop up the interface of date format settings (shown in Figure 4-15), then move the cursor and click on your preferred time format; and click the [Apply] button to save the settings, then click [exit] button to exit the system settings.

Figure 4-10 Date format settings



4.3.1.4 Setting cine playback speed

This system supports 1/1, 1/2, 1/4, 1/8 four kinds of speeds to select.

4.3.1.5 Choosing system language selection

The system supports languages modes: English, Chinese, Portuguese, Turkish, Spanish and Italian.

4.3.1.6 Setting automatic freeze

The system provide four freeze settings: auto freeze, auto freeze & close LCD, don't auto freeze but close LCD, and auto freeze off.

4.3.1.7 Setting Grid measurement

The system provide Grid measurement switch: on, off.

4.3.2 Image preset

Image preset contains probe type, Common, B mode and THI mode (not applicable) parameter settings.

Figure 4-11 Image preset surface

The screenshot shows the 'System Settings' window with the 'Imaging Preset' tab selected. The window is divided into several sections for parameter configuration:

- General Settings:** Includes 'Probe Type' set to '35C60H'.
- Common:** A sub-section containing 'Depth' (19.7cm), 'Focus Number' (1), 'Focus Depth' (8.0cm), and 'FOV' (3).
- B Mode:** Contains parameters for 'Gain' (51), 'Near Gn' (51), 'Far Gn' (51), 'Freq' (3.5MHz), 'FC' (2), and 'EE' (1).
- DR:** Set to 60.
- Colorize:** Set to 0.
- Smooth:** Set to 1.
- Density:** Set to H.
- Gray:** Set to C.

At the bottom of the window, there are four buttons: 'Apply', 'Save Current Status', 'Reload Factory', and 'Exit'.

Table 4-1 Image parameters

Parameters		Range
Depth		1.2~16cm
Focus number		1~4
Focus Depth		0.5~4.0cm
THI		unavailable
FOV		0~3
B Mode	Gain	0~100
	Near-Gn	0~100
	Far-Gn	0~100
	Freq	5.5MHz~10MHz
	DR	30~150
	FC	0~7
	EE	0~3
	Colorize	0~15
	Smooth	0~3
	Density	L
	Gray	A

4.3.3 Measurement settings

Measurement settings include general measurement setup and GA Reference. Shown as bellow figure.

Methods of setting default measurement:

1. Press the menu on the screen to select the option.
2. Press the menu on the screen or directly click [▼] on the right option to change the option.
3. Repeat step1~2 to modify other options. Then click [Apply] to save set; Click [Reload Factory] to recover the system factory set; and Click [EXIT] to exit the system settings surface.

Figure 4-12 Measurement setting surface

System Settings

General Settings | Imaging Preset | **Measurement Settings** | Version Info

Meas Setup

Default Area/Circ Method: Ellipse | Default Distance Method: Line

Default Distance Unit: mm | Default Weight Unit: Gram

GA Reference

Canine GSD	Nyland95	Ovine CRL	Gonzalez98	Equine GSD	EW1
Canine CRL	Nyland95	Bovine HD	Wright88	Equine CRL	Limerick2006
Canine HD	Nyland95	Bovine BD	Wright88	Equine BPD	Ven2004
Canine BD	Nyland95	Bovine CRL	Wright88	Equine AOD	Ven2004
Feline BD	Nyland95	Bovine UD	Hansen2005	Equine EOD)	Ven2004
Feline HD	Nyland95				

Apply

Reload Factory Exit

Table 4-2 General measurement setting

Measurement items	Measurement methods
Default area / perimeter method	Ellipse method, graphical method
Default distance measurement method	Segment, tracings
Default distance units	mm, cm
Default Weight Unit	Grams, ounces, pounds

Table 4-3 Gestational age references

Items	Gestational age measurements	Measurement formula
CANINE	GSD	Nyland95, Yeager95
	CRL	Nyland95, Yeager95
	HD	Nyland95, Yeager95
	BD	Nyland95, Yeager95
FELINE	BD	Nyland95
	HD	Nyland95
OVINE	CRL	Gonzalez98
BOVINE	HD	Wright88
	BD	Wright88
	CRL	EW1, Wright88
	UD	Hansen2005
EQUINE	GSD	EW1
	CRL	Limerick2006
	BPD	Ven2004
	AOD	Ven2004
	EOD	Ven2004

4.3.4 Version

You can view the current software and firmware version.

4.4 Frequency Selection

In the real-time image, the frequency can be adjusted through the left/right keys on the keyboard.

4.5 New Patient

To pop up the [New Patient] dialogue, please freeze the image and click [New Case]. The patient name and Exam ID can be input with a USB keyboard.

Figure 4-13 New Patient interface

The screenshot shows a 'New Patient' form with the following fields and values:

- ID: LW20180510135451
- Patient Name: [Empty text box]
- Exam ID: [Empty text box]
- Exam Mode: CANINE (dropdown menu)
- Sex: ☐ Male, ☒ Female, ☐ Unknown
- Birthday: 2018 (Year), 5 (Month), 10 (Day)

Buttons: OK, Cancel

4.6 Operating Mode

The system provides you with four scan modes of B, 2B, 4B, B/M and M, in the real-time, use the imaging controls to switch between B mode and M mode. We will take the convex array probe for example, and make a description of each mode.

4.6.1 B Model

Turn on the power switch, the images are displayed in B mode in the image area, and it is the system default mode.

4.6.2 2B Mode

In the real-time mode, move the cursor to the operating menu on the top of the screen, and click [2B] to switch the screen to the 2B mode.


The operating steps are as follows:

1. Click the [2B] button, and a B-mode image will be displayed on the left side of the screen;
2. Click the [RB] button again to activate the right side of the screen, and the screen will display two parallels of B-mode images. Among them, the left side is for the frozen image, while the right is for the real-time image, above which are the direction indications;
3. Repeatedly click the [RB] and [LB] button to switch left/right images between freeze and real-time;
4. Real-time mode, press [Depth] to adjust the depth of the real-time image;
5. Press [Freeze] to freeze the image, and press [Freeze] again to unfreeze the image;
6. Press the mode switching button of non-2B mode to switch to the other modes.

4.6.3 4B Mode

In the real-time mode, move the cursor to the operating menu on the top of the screen, click [page], then click [4B] to switch the screen to the 4B mode.

The operating steps are as follows:

1. Click the [4B] button, and a B-mode image will be displayed on the left top of the screen;
2. Click the [4B] button in turn to activate the other side of the screen, and the screen will display four B-mode images. Among them, the image which direction indication displayed  is in real-time state, while other three displayed grey are in frozen state.
3. Repeated click the [4B] button to switch four images between freeze and real-time;
4. Click [Page], then click [B] will return to B mode.

4.6.4 B/M Mode and M Mode

In the real-time mode, move the cursor to the operating menu on the top of the screen, and click [BM] to switch the screen to the B/M mode and M mode.

The operating steps are as follows:

1. Continuously click the [BM] button to respectively display the three image modes of Up B & down M, Left B & Right M and Full M;
2. Press [Freeze] to freeze the B/M image, and press [Freeze] again to unfreeze the B/M image;
3. Press the mode switching button of non-B/M mode to switch to the other modes.

4.7 Adjustment of Image Parameters

4.7.1 Adjusting the Gain

- Adjust the total gain: In real-time mode, move the cursor to the image information area on the left side of the screen, select [Gain], and press ◀ or ▶ to control the total gain of the whole image for a more satisfactory image.
- Adjust the Near gain: move the cursor to the image information area on the left side of the screen, select [Near-Gn], and press ◀ or ▶ to control the near gain.
- Adjust the Far gain: move the cursor to the image information area on the left side of the screen, select [Far-Gn], and press ◀ or ▶ to control the far gain.

The gain range is from 0dB to 100dB, with a minimum adjustment unit of 3. Press " ▶ " to increase the gain, and press " ◀ " to reduce the gain; in the image preset surface also can setup the gain.

4.7.2 Changing the Dynamic Range

In real-time mode, move the cursor to the image information area on the left of the screen, select [DR], and press ◀ or ▶ to adjust the overall comparison precision of B-mode image and M-mode scanning; for the B/M mode, the dynamic range is from 30dB to 150dB, with the stepping to 5dB. The dynamic

range values are displayed in the image information area on the left of the screen. In the case of viewing multiple images in 2B mode, only the value of the moving images will be displayed.

4.7.3 Setting Frame Correlation


Adjustment of frame correlation is to overlap and average the B-mode images of adjacent frame, and to remove the noises from the image, so that the image details are clearer.

In real-time mode, move the cursor to the image information area on the left of the screen, select [FC], and press ◀ or ▶.


The range of frame correlation is divided into eight adjustable levels from 0 to 7, in which 0 means no frame correlation, while 7 means the maximum frame correlation; when the image is frozen, the frame correlation cannot be adjusted.

4.7.4 Setting Edge Enhancement and Image Smoothing

The edge enhancement (EE) can highlight the image contour, which can more clearly identify the organizational structure edge of the image. But the image smoothing just has the opposite effect against the edge enhancement. In the case of 2B mode, only the value of the moving images will be displayed.

Click  on the left upper of the screen to enter the system settings surface, then click [Image preset] sub-menu, and click the drop-down list of [EE] and [Smooth] to select.

4.7.5 Setting Gray Scale

Click  on the left upper of the screen to enter the system settings surface, then click [Image preset] sub-menu, and click the drop-down list of [Gray] to select.

4.7.6 Adjusting the Focus

The system is provided with a variety of focus combinations, and each focus combination is consisted of different focus positions and quantities. The adjusting function of image focus is achieved through the Focus button. In the real-time B mode, through adjusting the focus, you can acquire more clear images on the target area.

Increase of the number of focus can, on one hand, can acquire a higher resolution at different probing depths, on the other hand, the number of focus will affect the frame rate of the image; the more the number of the focus is, the slower the frame rate will be.

To increase the direct viewing, the focus on the screen is displayed by the symbols of ◀ or ▶ next to the vertical ruler, and the position is consistent with the actual position of the focus.

The operating methods are as follows:

- In real-time mode, click [Focus +] or [Focus -] on the top of the screen to reduce or increase the number of focus, which shall be one at least and four at most; when the number of focus exceeds this range, press [Focus +] or [Focus -] once again, and the number of focus will remain unchanged.
- In real-time mode, press the [Focus] key to move the focus upwards and downwards, and the number of each focus is provided with 16 focus combinations; when the focus position is at the top or bottom, toggle this control once again to keep the focus position unchanged.


4.7.7 Changing Imaging Depth

Press the [Depth] key to control the increases and decreases of the imaging depth.

4.7.8 Changing Colorize

Optimize the grey-scale with color, in order to enhance the ability to discern.

In real-time state, Click upper operation menu [Tint+] or [Tint-] to change colorize.

Click  on the left upper of the screen to enter the system settings surface, then click [Image preset] sub-menu, and click the drop-down list of [Colorize] to select.

4.7.9 Screen Flipping

The system provides an up/down reverse function for the screen.

- In the frozen mode, move the cursor to the operating menu at the top of the screen, and click [More...] to turn over the page. Click the [UI Flip] button to flip the screen upwards and downwards.

4.7.10 Touch screen calibration

If your device's touch screen is not responding as accurately as it used to, run a calibration operation to restore its responsiveness. Click [TS Adjust] to begin the calibration process. Tap the areas of the screen specified by the calibration utility; your screen will be calibrated.


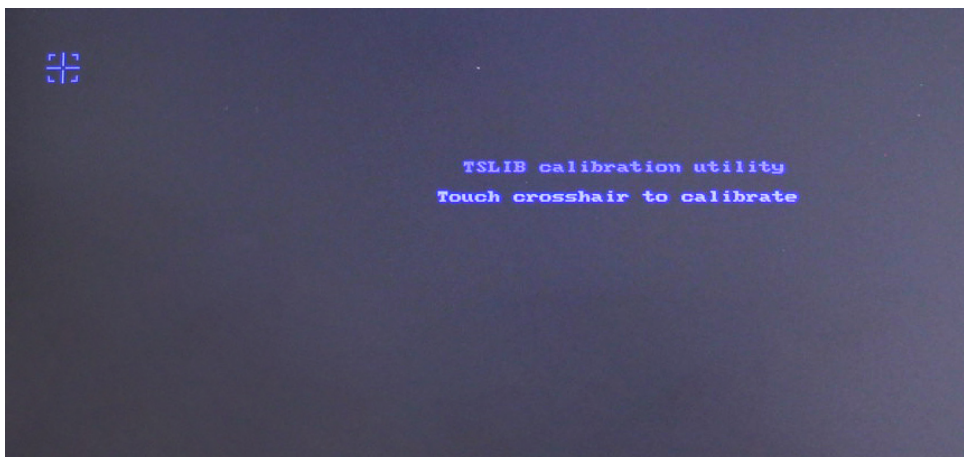
1. In the frozen mode, Press "▶", move the cursor to the operating menu at the top of the screen, When the cursor on [More...], press [OK] and "▶", Make cursor parked in [TSAdjust], and press [OK].
2. After the screen change duck seconds, Screen calibration interface would appear like the following figure, According to clew click the screen []

Figure 4-14 Touch screen calibration



4.8 Cine Playback

In the process of real-time imaging process, the system will automatically save the current frame to the corresponding cine storage buffer through the method of loop covering, and this buffer can store up to 480 frames. The area below the images below is the cine indicator, showing the current frame position and total frames of the buffer of the cine playing.

- Automatic playback:

In the frozen state, move the cursor to the operating menu at the top of the screen, and click the [Auto Play] button to enter the cine auto-playback mode;

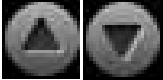




- Manual playback:

In the frozen state, move the cursor to the operating menu at the top of the screen, select the [More...] button, and click [Prev FR] or [Next FR] to enter the cine manual-playback mode;

4.9 Image Management and Print

4.9.1 Image Storage and Reviewing

In case the image is frozen, click the [IMG-Save] button to store the image, which will be displayed in the display column on the right of the screen.

	Next Page button.
	Enlarge Image button.
	Delete the selected image.
	U Disk button. Export images to U disk, and remove U disk.
	Open and view all the patients' image information.


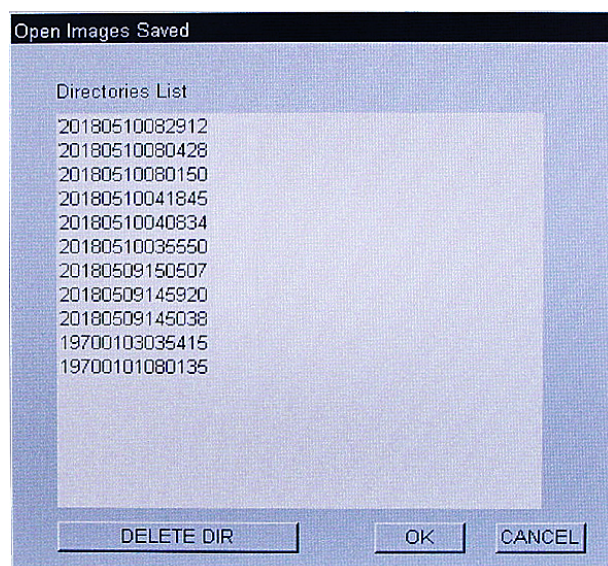
- Click the Next Page button to the next page to view the current patient's image information.
- Select the desired thumbnail images, and click the Enlarge Image button to enlarge the corresponding image and click again any place on the screen to exit
- Click  to pop up the selection box of [Open the Saved Image]. Move the cursor to select the desired patient ID, and click [OK] to display the thumbnail images saved under the patient ID in the display column on the right of the screen.

Figure 4-15 Open Image Saved



4.9.2 Image Transfer



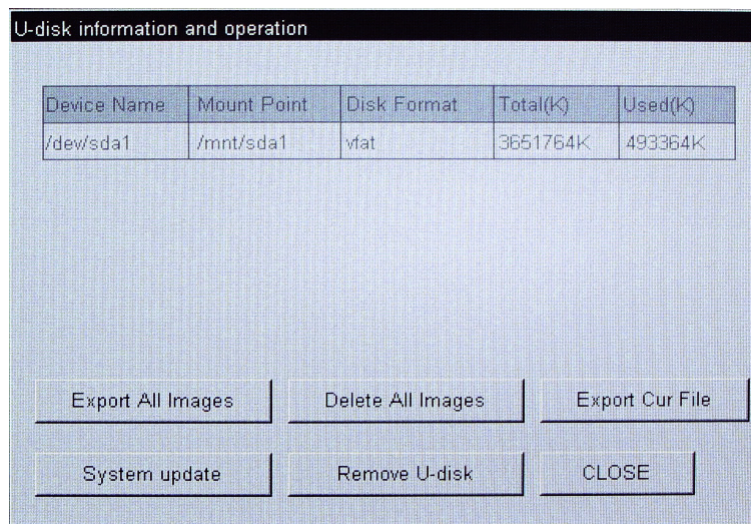
After the U disk is plugged, and the icon  appears on the top left corner of the screen, then you can store the images into the U disk. When the image storage is done, click  again, then pop up [U-disk information and operation] interface, as shown below:

Figure 4-16 U-disk information and operation



- Click [Export all Images], All the images will be stored to USB device;
- Click [Delete all images], All the images will be delete.
- Click [Remove U-disk], you can pull out the U disk when the system exit the [U-disk information and operation] interface.
- Click [system update] to update the software system, the system update can only be used by the service staff of our company; all the consequences arising from the user's unauthorized operation shall be undertaken by the user.



Note: U disk is suggested to use the 512M Netac U265 or 1 G Netac U208 matched by BMV; The system supports FAT32 file format, and before the U disk is used, it shall be formatted as FAT32 on the computer.

4.9.3 Print

This system supports MITSUBISHI P93W-S video printer to print.

- Video printer connection

Connect one end of the video printer to the TV-OUT (composite video port) of the system, and the other end to the video input port of the printer.

- Printing an Image

We recommend only printing an image when freezing.

To print an image, please adjust the parameters of the printer (such as brightness, contrast and print mode) first, then press the **【Print】** key of the printer.



Note: In order to perform print exactly, Please refer to the manufacturer's printer operation instructions prior,

Chapter 5 Measuring and Reporting

5.1 Measurement Overview

This system provides you with the operation methods of general measurements (B-mode general measurement, M-mode general measurement) and a variety of Special measurements (CANINE measurement, FELINE measurement, OVINE measurement, BOVINE measurement and EQNINE measurement). Special measurements perform only in B mode.

Figure 5-1 Display interface of measurement results



5.2 General Measurement - B Mode

The B-mode general measurement includes distance measurement, area/circumference measurement, volume measurement, angle measurement and histogram function.

In the frozen state, click the [Meas] button to enter the general measurements.

5.2.1 Distance Measurement

Distance measurement is the representative measurement among the B-mode images, which can also be carried out in M mode.

In general measurements, click the [Distance] button to enter the distance measurement mode, and repeatedly click [Distance] to switch between the line measurement and tracing measurement.

5.2.1.1 Line Distance Measurement

Function: measuring the distance between two respective points of the ultrasonic image. Measuring method:

1. Click the [Distance] button to switch to the line measurement mode, slightly click the starting point for measuring, then the "+" cursor appears on the screen, and the starting point for measuring is determined;
2. Move the cursor, then there is always a dashed line connecting between the cursor and the starting point, on the right of the screen displays the real-time measurement result of "+ D1: mm";
3. Move the cursor to the end point for measuring, and away from the touch screen, the measurement results will be ultimately determined; the measurement is completed;
4. Repeat Steps 2~3, and the next line measurement can be continued; the screen will automatically appears on the ratio between the two measurements. A picture can be measured up to 4 times, when the number exceeds 4 times, the next measurements will automatically replace the previous measurements;
5. Press [OK] to clear the measured data.

5.2.1.2 Tracing Distance Measurement

Function: calculating the distance by manual tracings. Measurement methods:

1. Click the [Distance] button to switch to the tracing measurement mode, and then the "+" cursor appears on the screen;
2. Move the cursor to the starting point for measuring, and slightly click the starting point;
3. Move the cursor along the target edge, draw the path, and move the cursor away from the touch screen after the end point is determined; the measurement will be displayed in real-time on the left of the screen;
4. Repeat Steps 2~3, and the next tracing measurement can be continued; the screen will automatically appears on the ratio between the two measurements. A picture can be measured up to 4 times, when the number exceeds 4 times, the next measurements will automatically replace the previous measurements;
5. Press [OK] to clear the measured data.

5.2.2 Area / Circumference Measurement

5.2.2.1 2D Ellipse Measurement

Function: measuring the circumference and area of a closed region by elliptical approximation.

Measurement methods:

1. Repeatedly click the [Area/Circumstance] button to switch to the 2D elliptical measurement mode, and then the "+" cursor appears on the screen;

2. Move the cursor to select the starting point of the long axis, and slightly click on the screen to determine the starting point;
3. Move the cursor to locate the end point in the long axis, and move the cursor away from the screen to determine the end point;
4. Move the cursor to select the starting point and end point of the short axis, and move the cursor away from the touch screen to determine the starting and end points; on this condition, the measurement result will be displayed on the right of the screen;
5. Press [OK] to clear the measured data;

To continue the functions of elliptical measurement, repeat steps 2 to 4, and a maximum of 4 sets of values can be measured.

5.2.2.2 2D Tracing Measurement

Function: calculating the area/circumference by manual tracings. Measurement methods:

1. Repeatedly click the [Area/Circumstance] button to switch to the 2D tracing measurement mode, and then the "+" cursor appears on the screen;
2. Move the cursor and slightly click on the touch screen, then select the starting point of the track;
3. Move the cursor to select the end point of the track, and move the cursor away from the touch screen; on this condition, the system will automatically connect the starting and end points of the track to form a closed graph, and the measurement results are displayed on the right of the screen;
4. Press [OK] to clear the measured data;
5. To continue the tracing measurement, repeat steps 2 to 3, and a maximum of 4 sets of values can be measured.

5.2.3 Volume Measurement

5.2.3.1 3-Distance

Function: calculating the volume via the measurements of three distance values, and the volume measurement requires the longitudinal and cross-sectional diagrams.

Measurement methods:

1. Click the [Volume] button to switch to the three-distance measurement mode, and press the screen two times then the "+" cursor appears on the screen;
2. Via the line distance measurement method in Section 5.2.1.1, measure the line length in different planes, on this condition, the actual volume values will be displayed on the right of the screen;
3. Press [OK] to clear the measured data;
4. To continue the three-distance measurement, repeat Step 2, and a maximum of 4 sets of values can be measured.

5.2.3.2 1-Distance

Function: calculating the volume via the measurements of a distance value.

Measurement methods:

1. Click the [Volume] button to switch to the one-distance measurement mode, and press the screen two

times then the "+" cursor appears on the screen;

2. Via the line distance measurement method in Section 5.2.1.1, draw a line, on this condition, the actual volume values will be displayed on the right of the screen;
3. Press [OK] to clear the measured data;

To continue the one-distance measurement, repeat Step 2, and a maximum of 4 sets of values can be measured.

5.2.3.3 Distance + Ellipse

Measurement methods:

1. Repeatedly click the [Volume] button to switch to the distance +ellipse measurement mode, and press the screen two times then the "+" cursor appears on the screen;
2. Via the line distance measurement method in Section 5.2.1.1, draw a line;
3. Via the line distance measurement method in Section 5.2.2.1 again, draw an ellipse, on this condition, the actual volume values will be displayed on the right of the screen;
4. Press [OK] to clear the measured data;

To continue the distance +ellipse measurement, repeat steps 2 to 3, and a maximum of 4 sets of values can be measured.

5.2.3.4 Ellipse + Ellipse

Measurement methods:

1. Repeatedly click the [Volume] button to switch to the ellipse +ellipse measurement mode, and press the screen two times then the "+" cursor appears on the screen;
2. Via the elliptical measurement method in Section 5.2.2.1, draw two ellipses on different planes, on this condition, the actual volume values will be displayed on the right of the screen;
3. Press [OK] to clear the measured data;

To continue the ellipse +ellipse measurement, repeat Step 2 and a maximum of 4 sets of values can be measured.

5.2.4 Angle Measurement

Function: measuring the angle between two different intersecting planes on the ultrasonic images, ranging from 0 ~ 90 °.

Measurement methods:

1. Click the [Angle] button to switch to the angle measurement mode, and press the screen two times then the "+" cursor appears on the screen;
2. Move the cursor to the starting point for measuring, and slightly click on the touch screen;
3. Move the cursor to locate the end point, move it away from the touch screen; after the end point is determined, a segment line is drawn on a plane;
4. Move the cursor to select the starting point for measuring to determine the starting and end points of the line segment, on this condition, on the right of the screen displays the real-time angle measurement between two intersecting planes of "+ Ang1";

5. Repeat the steps 2 to 4 and the next angle measurement can be continued.
6. Press [OK] to clear the measured data.

5.2.5 Histogram Measurement

Function: calculating the gray distribution of the ultrasonic echo signals within the designated areas. The measured area is closed with a rectangle and indicated with the histogram.



Note: The histogram measurement can be carried out only in the B mode.

Measurement methods:

1. Click the [Histogram] button to enter the histogram measurement mode;
2. Click on the screen and the cursor appears, so as to determine a vertex of the rectangle;
3. Move the cursor, and a rectangular sampling box appears on the screen;
4. Move the cursor away from the touch screen to determine the vertex of the rectangle;
when the histogram measuring region is determined, the coordinate axes of the histogram and calculated results will appear, and the calculated results are displayed on the right of the screen;
5. Press [OK] to clear the coordinate axes the measured data.

To continue the histogram measurement, repeat steps 2 ~ 4.

The meanings of the displayed values of the measurement results are as follows:

Total: indicating the number of the sampling points in the rectangular box;

Mean: indicating the gray average of the sampling points;

Most: indicating the number of the sampling points in the section with the most concentrated gray scales in the rectangular box (shown as the highest column in the figure);

Ratio: indicating the values of most/total;

sd: indicating variance.

5.3 General Measurement - M Mode

The M-mode general measurement includes the measuring of Distance (refer to 5.2.1.1 for details), Slope, Time and HR.

In the frozen state of B/M mode or full M mode, click the [Meas] button to enter the M-mode general measurements.

5.3.1 Heart Rate

Function: measuring the heart rate between the straight lone-dashed lines on the M image.

Measurement methods:

1. Click the [HR] button to enter the heart rate measurement mode, and on this condition, a straight long-dashed line appears on the screen;
2. Touch the screen to move the long-dashed line to the starting point for measuring, and after slightly

clicking the touch screen, the measuring baseline and another long-dashed line appear across the starting point, on this condition, the cursor can only move right or left, and the real-time measurement result will appear on the right of the screen;

3. Move the cursor to the end point for measuring, and the final measurement result will appear on the right of the screen, after which the measurement is completed and the system will automatically enter the next measurement.
4. Press [OK] to restart this measurement, and the real-time measurement result will appear on the right of the screen;

To continue the distance measurement, repeat steps 2 to 3, and a maximum of 4 sets of values can be measured.

5.3.2 Slope

Function: calculating the slope via measuring the distance between the two points of M-mode ultrasound image.

Measurement methods:

In the frozen state of B/M mode or full M mode, click the [Meas] button to enter the M-mode general measurements.

Click the [M Mode] button to enter the slope measurement mode. Please refer to Section 5.2.1.1 Line Distance Measurement for the specific operations.

5.3.3 Time

Function: Measure the time interval between two points of the image in M mode Measurement:

1. In the frozen state of B/M mode or full M mode, click the [Meas] button to enter the M-mode general measurements.
2. Click the [M Mode] button repeatedly, the measurement method will be switch between Distance, Slope and Time displayed on the System information area. Then select [Time];
3. Click the screen to move the long-dashed line to the starting point for measuring, and after slightly clicking the touch screen, the measuring baseline and another long-dashed line appear across the starting point, on this condition, the cursor can only move right or left, and the real-time measurement result will appear on the right of the screen;
4. Move the cursor to the end point for measuring, and the final measurement result will appear on the right of the screen, after which the measurement is completed and the system will automatically enter the next measurement.
5. Press [OK] to restart this measurement, and the real-time measurement result will appear on the right of the screen;

5.4 Canine Measurement

This section describes the Canine measurement function of the unit, including GSD, CRL, HD, ED.

Figure 5-2 Canine measurement menu

CANINE
GSD
CRL
HD
BD
EXIT

5.4.1 Methods of Canine measurement

1. In the frozen state, move the cursor to the operating menu at the top of the screen, and click the [Meas] button to enter the Special measurement menu, then click [CANINE] to open the Canine measurement menu;
2. Click your desired option of the menu, the system default measurement method is distance. (In measurement settings surface can change the measurement method)
3. In B mode, slightly click the starting point for measuring, then the “+” cursor appears on the screen, and the starting point for measuring is determined;
4. Move the cursor, then there is always a dashed line connecting between the cursor and the starting point, on the right of the screen displays the real-time measurement result of "+ D1: mm";
5. Move the cursor to the end point for measuring, and away from the touch screen, the measurement results will be ultimately determined; the measurement is completed;
6. Repeat Steps 2~4, and the next line measurement can be continued; the screen will automatically appears on the ratio between the two measurements. A picture can be measured up to 4 times, when the number exceeds 4 times, the next measurements will automatically replace the previous measurements;

5.5 Feline measurement

This section describes the Feline measurement function of the unit, including HD, ED. (refer to section 5.4.1 for the specific method)

Figure 5-3 Feline measurement menu

FELINE
HD
BD
EXIT

5.6 Ovine Measurement

This section describes the measurement function of Ovine measurements, including CRL. (Refer to section 5.4.1 for the specific method)

Figure 5-4 Ovine measurement menu

OVINE
CRL
EXIT

5.7 Bovine Measurement

This section describes the measurement function of Bovine measurements, including HD, CRL. (Refer to section 5.4.1 for the specific method)

Figure 5-5 Bovine measurement menu

BOVINE
HD
BD
CRL
UD
EXIT

5.8 Equine Measurement

This section describes the measurement function of Bovine measurements, including GSD, CRL, BPD, AOD, EOD.(refer to section 5.4.1 for the specific method)

Figure 5-6 Prostate volume measurement menu

EQUINE
GSD
CRL
BPD
AOD
EOD
EXIT

5.9 Pig Measurement

This section describes the measurement function of Bovine measurements, including HD, BD, CRL, GSD, HIDETHICK, FATTHICK, LOINTHICK, and LOINAREA. (Refer to section 5.4.1 for the specific method)

Figure 5-7 Pig measurement menu



Pig	
HD	✓
BD	
CRL	
UD	
HIDETHICK	
FATTHICK	
LOINTHICK	
LOINAREA	
EXIT	

Chapter 6 Technical Specifications

6.1 Technical Parameters

Table 6-1: Technical Parameters

Scanning	Electronic linear array & electronic convex array;
Scanning Angle	30 ~ 145°;
Depth	24cm; (convex array probe)
Frequency Range	2.0 ~ 10MHz;
Probe Configuration	Standard:65EL70S (Rectal Linear probe); Optional:75EL50S (Rectal Linear probe); 75L50S(Convex Probe); 35C60H(Convex Probe); 65C15S(Micro-Convex Probe)
Section thickness	35C60H less than 8.0mm,;
Display Mode	B, 2B, 4B,B/M, M;
Cine Playback	480 frames, auto playback and manual playback;
Edge Enhancement	Adjustable from 0 to 3 grades;
Dynamic Range	30 ~ 150dB, stepping of 5dB;
Frame Correlation	Adjustable from 0 to 7 grades;
Gray-scale Transformation	Adjustable from A to P grades;
Type of Focusing	Four types of focusing (4 focusing combinations, 16 focus positions respectively available);
Screen Reversing	Up/Down reversal;
Display Information	Trade name, hospital name, patient ID, date/time, probe information, IP settings, focus marker, scale, direction signs, depth, gray bar;
Examination Subjects	Canine, Feline, Ovine, Bovine, Equine
B-mode Measurement	Distance, area/circumference, angle, volume, histogram;
M-mode Measurement	Time, HR, Slope, Distance;)
The following are the special measurements for each examination subject	
Canine	GSD,CRL,HD,BD
Feline	HD,BD

Ovine	CRL	
Bovine	HD,BD,CRL,UD;	
Equine	GSD,CRL,BPD,AOD,EOD;	
Storage	Image storage, image browsing, Video printer;	
Acoustical power output parameters are as follows: (Test condition: B mode, 35C60H, 3.5MHz)		
	Maximum Power (mW)	2.2
	P-(MPa)	1.01
	Ispta (mW/cm2)	21.48
	Iob (mW/cm2)	0.47
	System Settings	Single focus, depth: 19cm
	Ip (mm)	27.8
	Wpb6 () (mm)	1.60
	() (mm)	8.57
	pr (KHz)	N/A
	srr (Hz)	13.58
	Output beam size (cm²)	0.1024
	fawf (MHz)	3.95
	APF	100%
	Startup Mode	B mode
	AIF	100%
	Initial Mode	B mode
	Acoustic Output Freeze	Yes
Monitor	Standard 7-inch TFT LCD, screen resolution of 800 X 480;	
Cursor	S6 supports manual touch-screen operation;S6 supports USB mouse operation;	
External Port	USB, TV-OUT (composite video port), probe ports, power input port;	
Battery Power	11.1V 2500mA/27.75wh	
Adapter	AC INPUT: 100-240~1.5-0.7A. 50-60Hz DC OUTPUT: 15V. 2.8A	
Weight	0.8kg (excluding battery, about 0.4kg)	
Volume	245X153 × 41 mm	

6.2 System Requirements

This section describes the power and environmental requirements of the ultrasound diagnostic unit.

6.2.1 Power Requirements

Power input: 100-240V AC 50Hz 42VA

6.2.2 Peripherals

Only the peripheral devices listed in this manual can be used in conjunction with the ultrasound diagnostic system. Any other non-approved device used in conjunction with the ultrasound diagnostic system may endanger the user's safety, which may also cause the invalidation of the system warranty. Peripheral devices included with the system must be installed by the representatives authorized by BMV.



Note: BMV only guarantees the performance and safety of the equipment listed in the Configuration List. If you have any questions, please contact the Customer Service Department of BMV or the local BMV representative.

6.2.3 Operating Environment Requirements

- Ambient Temperature: 5 °C~ 40 °C;
- Ambient Humidity Range: ≤ 80%
- Air Pressure Range: 700hPa ~ 1060hPa;
- Stay away from the strong electric field, magnetic field equipment and high-voltage equipment;
- Avoid direct strong lights exposing to LCD. The indoor room should be lightproof, in order to facilitate the image viewing, maintain ventilation and prevent dusts.

6.3 Transport and Storage

6.3.1 Requirements of Transport & Storage

- Ambient Temperature Range: -20°C~ +55°C;
- Ambient Humidity Range: <93%;
- Air Pressure Range: 500hPa ~ 1060hPa;

6.3.2 Transport of the Unit

In the process of transporting the unit, please do the following as needed.

Make good preparations for transporting the unit for a long distance or on the bumpy roads:

- Disconnect the probe, and unplug the power cables and some peripheral devices;
- Re-package the unit with factory packaging;
- To prevent lateral movement during the process of the unit transport, please fix the unit well;
- To prevent the unit from a sudden vibration during the course of transport, please place a shock pad below the unit.

6.3.3 Transport of Probe

- Disconnect the probe from the unit;
- Correctly place the probe in the probe box; as the probe box is precisely designed that can reliably protect the probe, the user should not throw it away.

6.4 Disposal of Packaging

- Please keep all the internal and external packaging of the equipment so as to be used for transporting and moving;
- Please store the internal packaging and external packaging of the equipment together.

6.5 Loss Statement

- There are no replaceable or expendable parts of the equipment.
- If a fault occurs, please contact the Supplier, and do not dismantle the unit without approval.

6.6 Description of Electromagnetic Interference

The unit shall be used in the places such as hospitals, physical examination centers and research institutions that can provide the protections of electromagnetic interference and power supply. If the unit is used in the environment without effective anti-electromagnetic interference capacities, the unit will be interrupted by radio signals, television signals or other signals, which will affect the normal use of the unit.