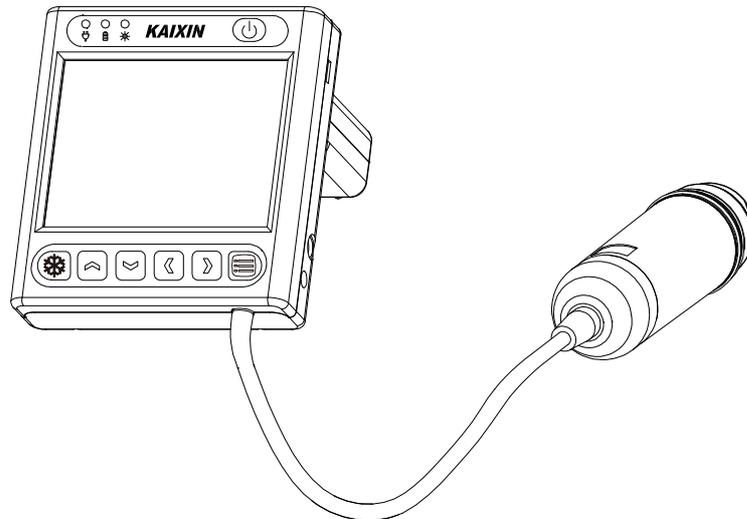


**KAIXIN**

**MSU3**

**Full Digital Mechanical Sector Scanning  
Ultrasonic Diagnostic Instruments (Vet)**

## User's Manual



**XUZHOU KAIXIN Electronic Instrument Co., Ltd.**

## Introduction

Thank you for purchasing MSU3 full digital mechanical sector scanning ultrasonic diagnostic instruments.

Users shall carefully read through this manual and fully understand the text before operating the equipment.

Please keep this manual after reading so that you can access at any time when needed.

The user's manual issue date: January 15, 2016, Version: V1.00

For the changes of appearance, this manual is subject to change without further notice!

## Intellectual Property Information

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Kaixin has the final explanation right of this user's manual.

Kaixin was considered responsible for the safety, reliability and performance in case of meeting all the following requirements:

1. Assembly, expansion, readjustment, improve and repair are all performed by professionals recognized by Kaixin;
2. All replacement parts and accessories, consumables involved repairs are Kaixin company (original) or approved by Kaixin;
3. Related electrical equipment complies with national standards and the requirements of the user's manual;
4. Operate the product in accordance with the user's manual.

## Warranty and repair service

Purchased the product warranty, sees the company's service policies.

The qualified service personnel can repair the instrument out of warranty by themselves. But this should be agreed by Xuzhou Kaixin Electronic Instrument Co., Ltd. We will provide circuit diagrams, component part lists or other information to assist service personnel to repair those parts of our equipment that are designated by our company.

## Manufacturer's Information



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## Important Statement

1. User shall be fully responsible for the maintenance and management of this product after purchasing this product.
2. Even in the warranty period, warranty does not include the following:
  - a) Damage or loss caused by error or rough using.
  - b) Damage or loss caused by force majeure (such as fires, earthquakes, floods, or lightning etc.).
  - c) Damage or loss caused by not meeting the conditions of use specified by the system, such as inadequate power supply, incorrect installation or environmental conditions do not meeting the requirements.
  - d) Damage or loss caused by not used the system in the initial buy region.
  - e) Damage or loss caused by the system purchased not by Kaixin or its authorized dealer or agents.
3. Medical personnel qualified with professional qualifications only to use this system.
4. Do not modify the software or hardware of the equipment without authorization of the manufacturer.
5. In any case, Kaixin shall not be liable for the problems, damages or losses due to re-installation, alteration or repair the system by non-Kaixin designated personnel.
6. This product is intended to provide clinical diagnostic data for the doctor.  
The doctor shall be responsible for the diagnostic process. Kaixin shall not be liable for any problems arising out of the process.
7. Be sure to back up important data to external storage media, such as notebooks.
8. Due to operator's error or abnormal condition causing the data stored in the internal system is lost, Kaixin is not responsible.
9. This user's manual contains warnings for predictable dangers. Users shall also exercise care at any time to be aware of the dangers unforeseen in this manual. Kaixin shall not be liable for the damages and losses arising out of neglecting to follow the operation instructions herein described.
10. This user's manual shall be furnished with the machine so that managerial and operating personnel can refer to it any time as necessary. Once the managerial personnel of the system changes, it shall hand over this user's manual.
11. Deal with the exhausted product according to the local statute.
12. The maintenance and servicing of product shall be performed by the trained engineer or by Kaixin Electronic Instrument Company Ltd.

## Safety Cautions

### 1. Warning Symbols and Definitions

The following warning symbols are used in this manual to indicate safety level and other important items. Please remember these symbols and understand the meaning as you read this user's manual. These symbols convey specific meanings as detailed in the table below:

Symbols & Words	Connotation
 <b>Danger</b>	Indicates an imminent danger that may result in personal death or serious injury if not avoided.
 <b>Warning</b>	Indicates a potential danger that may result in personal injury if not avoided.
 <b>Attention</b>	Indicates a potential danger or unexpected use condition that may result in light injury or property loss or affecting the use if not avoided.

### 2. Safety Symbols

Symbols	Meaning	Symbols	Meaning
	Type B applied part		Up
	Direct current		Keep dry
	Power switch		Fragile
	Power supply indication		Stacking limit by number
	Battery charge indicator		Temperature limits (Storage and transport)
	Adapter connection indication		Humidity limitation (Storage and transport)
	Follow instructions for use		Atmospheric pressure limitation (Storage and transport)
	Marking for the separate collection of electrical and electronic equipment		

	<b>Symbol for the marking of electrical and electronics devices according to Directive 2012/19/EU. The device, accessories and the packaging have to be disposed of waste correctly at the end of the usage. Please follow Local Ordinances or Regulations for disposal.</b>
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## Chapter 1 Technical Specifications

### 1.1 Technical parameters

1. Gray scale: 256
2. Monitor: 3.5" LCD
3. Adapter rating: 100-240V~, 1.2-0.6A, 50-60Hz (model: BJE01-40-001M)
4. Output of Adapter: DC12.8V 3.0A
5. Main device rating: DC12V 3.0A
6. Main Unit Size: approx. 90 \* 98 \* 25 (L \* M \* H, mm)
7. Weight of main unit: approx. 620g (including battery and probe)

### 1.2 Primary Functions

1. System preset function;
2. Mode conversion function;
3. Adjustment of near field, far field, total gain and dynamic range;
4. Frequency conversion function;
5. Frame correlation function;
6. Compress curve adjustment function;
7. Color display function;
8. Depth range selection function;
9. Image freeze/unfreeze function;
10. Measurement of backfat thickness, loin thickness and lean percentage;
11. Image storage function;
12. Energy saving;
13. Chinese-English switch function.

## Chapter 2 Product appearance

### 2.1 Structure composition of the instrument

MSU3 full digital mechanical sector scanning ultrasonic diagnostic instruments (Vet) are composed of main unit and probe, etc.

### 2.2 Components name

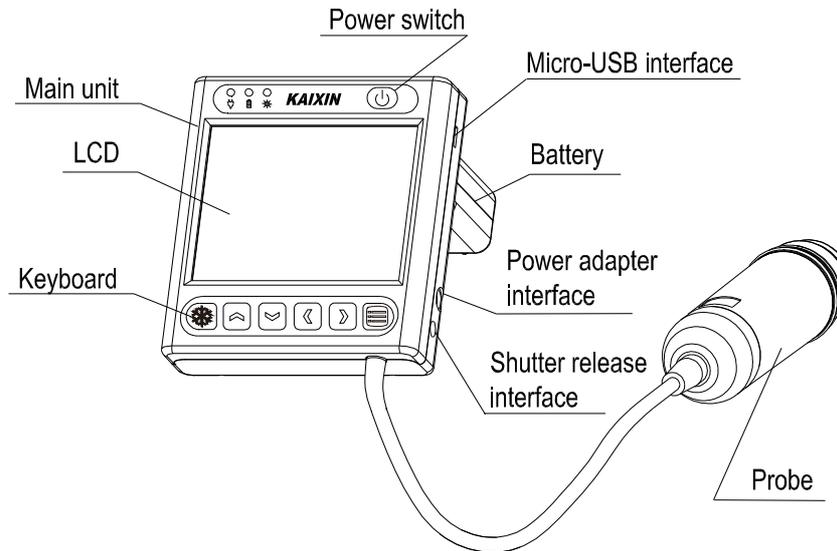


Figure MSU3 main unit sketch map

### 2.3 Function keys description

SN	Function keys	Function
1		Image parameters menu, System setting menu in frozen status
2		Selection and adjustment of parameters; Mode selection; Depth selection, etc.
3		Freeze/Unfreeze
4		Power switch

## Chapter 3 System Configuration

### 3.1 Standard Configuration

1. Main unit	1 unit
2. 3.5MHz mechanical sector probe	1 PC
3. Power adapter	1 PC
4. Internal battery	1 PC
5. Power cable	1 PC
6. Shutter release	1 PC
7. OTG U disk	1PC
8. Velcro straps	1 Set
9. Portable bag	1 PC

## Chapter 4 Operation Condition

### 4.1 Power Requirements

Adapter rating: 100-240V~, 1.2-0.6A, 50-60Hz

Adapter model: BJE01-40-001M

Output of adapter: DC12.8V 3.0A

Main device rating: DC12V 3.0A

**⚠Warning:** AC/DC adapter is as a part of the equipment, please only use the AC/DC adapter provided by manufacturer.

### 4.2 Operation Environment

Ambient temperature: 10°C-40°C

Relative humidity: 30%-75% (without condensation)

Atmospheric pressure: 800hPa-1060hPa

Altitude: < 2000 m

Overvoltage: Overvoltage Category II

Pollution degree: 2

### 4.3 Transport and Storage

Ambient temperature: -20°C-55°C

Relative humidity: 30%-93% (without condensation)

Atmospheric pressure: 700hPa-1060hPa

**⚠Danger:** Do not use this equipment where flammable gas (such as anesthetic gas, oxygen or hydrogen) or flammable liquid (such as alcohol) are present. Failure to do so may result in explosion.

**⚠Warning:** Avoid using this equipment with high-frequency electric knife, high-frequency therapy equipment or defibrillators and other electronic devices, or may an electric shock occur to the patient.

**⚠Attention:** The main voltage is varies with different countries or regions.

**⚠Attention:** Using radio transmitting equipment nearby the system may interfere with the normal operation of the system. Prohibited carry or use of devices that can generate radio waves within the room installed this system, such as cell phones, radio transceivers and wireless remote control toys.

**⚠Attention:** System should be avoided using in following environments:

1. Moist	2. Rain	3. Thunderstorm weather
4. No ventilation	5. Close to heat source	6. Direct sunlight
7. Dramatic temperature change		8. Poisonous gas
9. Corrosive gas		10. Strong shock
11. Strong electromagnetic field (e.g. MRI)		12. Radiation (e.g. X-ray, CT)
13. Defibrillators or short wave therapy equipment		

## Chapter 5 System Installation and Check

**⚠Warning:** To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

**⚠Warning:**

1. All plugs of instruments of this system shall be connected into the power socket with protectively earth on the wall and the socket must meet the requirement of power rating of instrument. Use of multiple portable socket-outlets may affect protective earth to make leakage currents exceed the safety requirements.
2. Please follow the correct electrical connections method to connect the power supply and earth, otherwise there will be danger of electric shock. Do not connect the grounding wire to any gas pipe or water pipe, or it may cause bad grounding and danger of explosion.
3. This equipment is not waterproof, not use this equipment in place where liquid may into the interior of the equipment. Never pour any liquid on the equipment; otherwise there will be danger of electric shock or cause equipment damage. If accidentally spill liquid on the equipment, turn off the power immediately and contact your local representative.
4. Additional equipment connected to the medical electrical equipment must comply with the respective IEC or ISO standards (e.g. IEC60950 for data processing equipment). Furthermore all configurations shall comply with the requirements for medical electrical systems (see IEC 60601-1-1 or clause 16 of IEC60601-1 3rd, respectively). Anybody connecting additional equipment to medical electrical equipment configures a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above mentioned requirements. When more than one device is connected to use, the accumulation of leakage current may cause the danger of security. If in doubt, consult your local representative or the technical service department.
5. Prohibit the live parts of the equipment or other devices (such as various signal input and output ports, etc.) contact with the patient, if this equipment or other equipment has failure, the patient will have danger of electric shock.
6. If the integrity of the external protective conductor in the installation or its arrangement is in doubt, equipment shall be operated from its internal electrical power source.

**⚠Warning:**

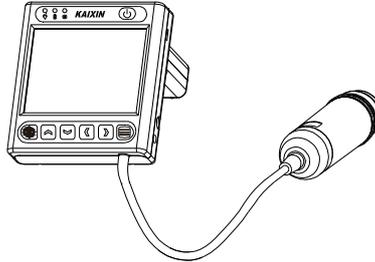
1. When instrument works abnormally, do stop working, turn off the power and check the reason, then contacts the KAIXIN Company about it.
2. Turn off power and pull out of the plug from socket after each ultrasonic diagnostic operation.
3. It is forbidden to drag and press the power and probe cables emphatically; regularly inspect whether there is pull-apart and bareness, if there is the phenomena like this, turn off power supply immediately, stop using it and change it for new one.
4. It is forbidden to load and unload the probe or move the instrument in galvanic to avoid danger of safety.
5. Pull out of the plug from socket after operation in thunderstorm weather to avoid the instrument being damaged by lightening.
6. If the temperature changes greatly in short time will cause vapor recovery inside of instrument, the case may damage the instrument.
7. The equipment is switched completely only by disconnecting the power supply from the wall socket.

**⚠Warning:** The power adapter, shutter release, battery and power supply cord as described in this section are replaced by operator. But these parts must be provided by KAIXIN or his authorized supplier.

## 5.1 System installation

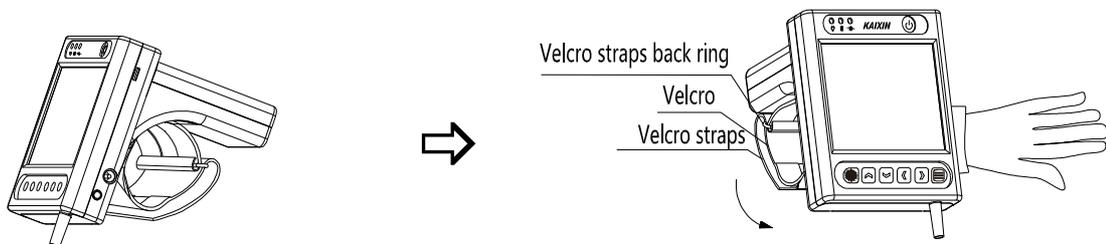
Please carefully read through and fully understand the use-method before installing the system, and check the goods for its completeness according to the packing list furnished. This system provides the following several usages, for the user to select:

1. Place the instrument on a desktop to use



2. Instrument fixed in the wrist to use

**⚠Attention: when using the Velcro straps, if allergy, please consult a doctor immediately and increase protective measures (e.g. Wear gloves before use).**



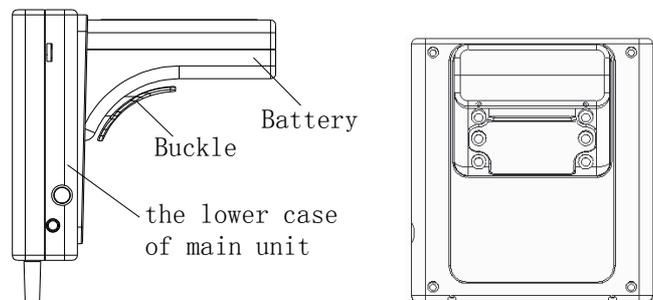
- a. Extend your hand into the Velcro straps, the strap worn on the wrist, and then the Velcro through the back ring;
- b. According to arrow direction tighten the Velcro to suitable position then closely fitting.

## 5.2 Install/Remove the battery

Service personnel or operator can replace the battery. Before replacing the battery, please contact Kaixin Company; replace the battery under the guidance of Kaixin Company. Please use the battery provided by Kaixin Company.

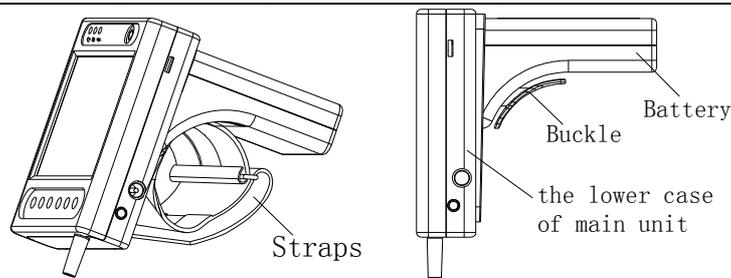
### 1. Install the battery

With four M3\*6 pan-head screws fix the battery on the lower case of main unit, paste the Velcro on the buckle position, then put the buckle into the battery, at last with two M3\*6 pan-head screws fix the buckle on the lower case of main unit, as shown:



### 2. Remove the battery

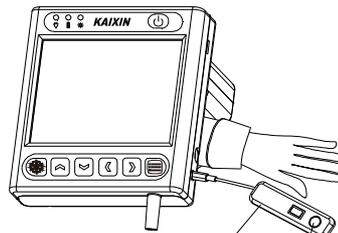
First open the Velcro, remove the straps, and then use a screwdriver to remove two M3\*6 pan-head screws to remove the buckle, then unscrew the four M3\*6 pan-head screws, remove the battery.



**⚠Warning: Do not short-circuit the battery terminals.**

### 5.3 Connection to shutter release

Install shutter release to shutter release interface (Freeze interface) as shown in the figure.



In the operation, you can "freeze" or "unfreeze" images using shutter release

### 5.4 Connection to power

#### 1. Connect to the power adapter

Insert the output plug of adapter into DC power input port, which is on the right side of main unit.

#### 2. Connect to the main power supply

Insert the power plug (jack) furnished with the machine into power input socket of the power adapter, the other end to the mains socket-outlet. The instrument uses three-core power supply. It connects with the protective earth line when power plug inserts into the standard power socket.

#### ⚠Warning:

1. Adapter has no switch. **APPLIANCE COUPLER** or **MAINS PLUG** is used as the intended disconnection device from the supply mains. Do not position the **EQUIPMENT** the place where it is difficult to operate the disconnection device.
2. AC/DC adapter is as a part of the equipment, please only use the AC/DC adapter provided by Kaixin Company.
3. To avoid damaging power adapter or harming people by unexpected fallen, make sure the power adapter is placed on the leveled desk.
4. The operator must not touch signal input/output and patient simultaneously.

### 5.5 Ultrasonic probe check before and after operation

Before and after ultrasonic diagnosis to check if there are any exceptionally on the surface of the probe or cable jacket, such as peeling, cracks, bulge, or if the acoustic lens is reliable, cleaned or disinfected.

### 5.6 Main unit check before and after operation

#### 5.6.1 Inspection before start-up

Check the following items before starting the machine:

1. The temperature, humidity and atmospheric pressure shall meet the requirements of operation condition.
2. No condensation occurs.
3. No distortion, damage or contamination on system and peripheral. Clean the parts as specified in relevant sections, if the contaminant is present.
4. Check the keyboard, LCD screen and enclosure to ensure they are in good working condition and free of abnormality (such as cracks and loosened screws).
5. No damage on cables (e.g. power cable, etc.), and not loose the connection.
6. Check probe and its connections to ensure they are free of abnormality (such as scuffing, drop-off or contamination). If the contaminant is present, clean, disinfect the contaminated objects as specified in relevant sections.
7. See to it that probe has been cleaned, disinfected; else dispose it as specified in relevant sections.
8. Check all the ports of the machine for possible damage or blockage.
9. Clean the field and environment.

### 5.6.2 Inspection after start-up

Check the following items after starting the machine:

1. No abnormal voice, strange smell and overheating appear.
2. Check the machine to ensure a normal start-up: The power indication light is on; the machine will automatically enter B mode.
3. Check the acoustic lens for abnormal heat when the probe is in use. This can be done by hand touching the probe to feel the temperature of the lens.
4. Check the image to ensure trouble-free display (e.g. no excessive noise or flicker).
5. Check the keyboard to ensure normal operation condition.
6. Check the instrument to ensure that the phenomenon of too high local temperature will not appear.

**⚠Attention: If the overheat acoustic lens is placed on the patient's skin, heat injury may occur.**

**⚠Attention: Thoroughly clean the coupling gel on the probe surface each time after ultrasonic operation, or the coupling gel may become hardened on the acoustic lens of the probe, deteriorating quality of image.**

## 5.7 System reset

In case of abnormal screen display or no-working for system operation, turn off the power and try to restart the system.

## Chapter 6 Functional Operation

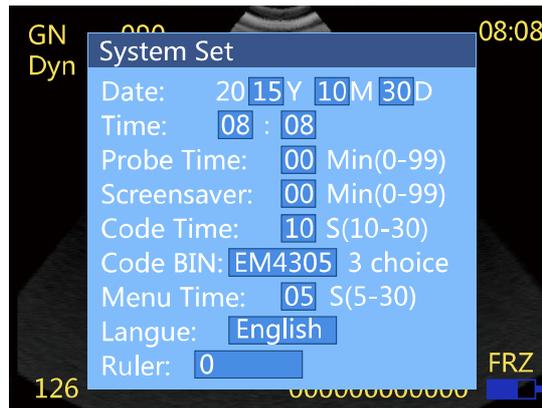
### 6.1 Startup and Shutdown

In shutdown status, hold down  key, machine starts up, power indicator  lights.

In startup status, hold down  key, machine shuts down, power indicator  goes out.

### 6.2 System Functions Setting

In B, 2B mode and in frozen status can be set as follows:



#### 6.2.1 Date setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Date” item, and then press  or  key to adjust the date;
3. Press  key to confirm the date setting and quit system setting interface.

#### 6.2.2 Time setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Time” item, and then press  or  key to adjust the time;
3. Press  key to confirm the time setting and quit system setting interface.

#### 6.2.3 Probe protect time setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Probe Time” item, and then press  or  key to adjust the probe protect time;
3. Probe protect time is “0-99” minutes, “0” stands for turn off the probe protection;
4. Press  key to confirm this setting and quit system setting interface.

**Note: In real-time status, the probe will be automatically frozen when the system reaches the time of probe protection, press  key to freeze and return to normal operation status.**

#### 6.2.4 Screensaver setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Screensaver” item, and then press  or  key to adjust the screensaver time;

3. Screensaver time is “0-99” minutes, “0” stands for turn off the screensaver;
4. Press  key to confirm this setting and quit system setting interface.

**Note: Go beyond the system setting screensaver time without pressing any key, the machine will automatically enter a black screen status. Press any key, the system will return to normal operation status.**

### 6.2.5 Code time setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Code Time” item, and then press  or  key to adjust the ear tag waiting time;
3. Ear tag waiting time (Code Time) is “10-30” seconds;
4. Press  key to confirm this setting and quit system setting interface.

**Explanation: The ear tag scanning function is to be upgraded.**

### 6.2.6 Code BIN setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Code BIN” item, and then press  or  key to choose the ear tag format;
3. Ear tag formats have three, namely “EM4305”, “EM4100” and “T5557”;
4. Press  key to confirm this setting and quit system setting interface.

**Explanation: The ear tag scanning function is to be upgraded.**

### 6.2.7 Menu time setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Menu Time” item, and then press  or  key to adjust the menu disappear time;
3. Menu disappear time is “5-30” seconds;
4. Press  key to confirm this setting and quit system setting interface.

### 6.2.8 Chinese-English setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Languge” item, and then press  or  key to choose Chinese or English;
3. Press  key to confirm this setting and quit system setting interface.

### 6.2.9 Ruler setting

1. Press  key and then press  key to enter “System Set” menu;
2. Press  or  key to move the cursor to “Ruler” item, and then press  or  key to adjust the value;
3. Ruler has three status, “0” shows no ruler, “1” shows 10mm-spacing dot-like ruler, “2” shows horizontal and vertical 10mm-spacing dot-like ruler;
4. Press  key to confirm this setting and quit system setting interface.

**Note:**

1. During set above items, you can press  key to exit the “System Set” menu at any time and give up the settings.
2. The above settings can be finished at once after entering “System Set” menu, and then exit.

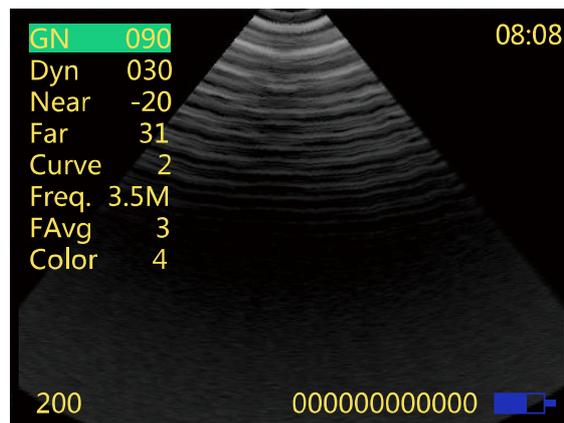
## 6.3 Mode switching

Diagnostic modes have 3 kinds, which respectively are B, 2B and A. B mode is default after starting up.

1. Press  key to start up, the system will automatically enter into B mode;
2. Press  key to enter 2B mode, the left side of the screen displays single B-mode real-time image;
3. Press  key again, the left image is frozen, the right of the screen displays real-time image;
4. Press  key again to enter A mode;
5. Press  key again to return to B mode;
6. Repeatedly press  key to achieve the cycle conversion among the B, 2B, A mode.

**Note:** Repeatedly press  key also to achieve the cycle conversion among the B, A, 2B mode.

## 6.4 Image adjustment



### 6.4.1 Image adjustment in B, 2B mode

In B, 2B mode and in real-time status, you can adjust images' gain, dynamic range, near field, far field, compression curve, frequency, frange average and color.

#### 6.4.1.1 Gain adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "GN" item;
2. Press  or  key to adjust the parameter within "27~90"; Press direction key  to increase image total gain and press direction key  to reduce total gain so as to control the total gain of the entire image.
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.2 Dynamic range adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Dyn" item;
2. Press  or  key to adjust the parameter within "27~90"; Press direction key  to increase the value of dynamic range and press direction key  to decrease the value of dynamic range so as to control the dynamic range of the entire image.

3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.3 Near field gain adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Near" item;
2. Press  or  key to adjust the parameter within "-31~0"; Press direction key  to increase near field gain and press direction key  to reduce near field gain so as to control the gain in near field region.
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.4 Far field gain adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Far" item;
2. Press  or  key to adjust the parameter within "0~31"; Press direction key  to increase far field gain and press direction key  to reduce far field gain so as to control the gain in far field region.
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.5 Curve adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Curve" item;
2. Press  or  key to adjust the parameter within "0~3";
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.6 Frequency adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Freq." item;
2. Press  or  key to switch the frequency between 2.5MHz and 3.5MHz;
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.7 Frame average adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "FAvg" item;
2. Press  or  key to adjust the parameter within "0~5";
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

#### 6.4.1.8 Color adjustment

1. Press  key to enter image adjustment menu, press  or  key to enter "Color" item;
2. Press  or  key to adjust the parameter within "0~7", realize conversion among eight sets of colors (including one set of black and white).,
3. After waiting for 5-30s ("Menu Time" set in the System Set), the parameters will be saved and exit the image adjustment menu.

**Note: The above parameters can be finished at once after entering image adjustment menu, and then exit.**

## 6.4.2 Gain adjustment in A mode

1. In A mode and in real-time status, press  key to enter gain adjustment status;
2. Press  or  key to adjust the gain within “27~90”;
3. After waiting for 5-30s (“Menu Time” set in the System Set), the parameters will be saved and exit the gain adjustment status.

## 6.5 Depth range selection

In B, 2B mode and in real-time status, press  or  key to obtain the images of different depth. It has three kinds of depth range selection, namely 126, 163, 200.

## 6.6 Image freeze/unfreeze

In real-time mode, press  key to freeze the image, the lower right corner of the image displays “FRZ”; in frozen status, press  key to unfreeze the image.

## 6.7 Image storage and viewing

### 6.7.1 Image storage

#### 6.7.1.1 Save image in B, 2B mode

1. Insert OTG U disk into the Micro-USB interface at the right side of main unit, the lower left corner of the screen appears “U Disk” prompt;
2. Press  key to freeze the image;
3. Press  key, then press  or  key to record the pregnancy status, Y(Yes), N (No), TBD (To Be Determined);  
**Description: “Y” represents pregnant, “N” represents not pregnant, and “TBD” indicates uncertainty pregnancy.**
4. Press  key, the system issued a “tick, tick” tone, namely the current image and EXCEL spreadsheet stored in the “IMAGE” folder of the U disk;
5. Press  key to return to the real-time status.

**Note 1: The “IMAGE” folder includes “images folder” and “EXCEL” spreadsheet.**

**Note 2: The “images folder” is automatically named by the machine current date; the image is is automatically named by the machine current time.**

**Note 3: “EXCEL” spreadsheet is automatically named by the machine current date.**

**Note 4: The EXCEL spreadsheet records the pregnancy status for each inspection according to chronological order. In the EXCEL spreadsheet, the contents of each Colum respectively: serial number, Ear tag, check date, check time, and pregnancy status. If there is no Ear tag, the Ear tag is expressed as A00000000000.**

**Note 5: For the ear tag function, to be upgraded.**

Such as:

U:\IMAGE\20160217\082736.bmp

It represents that at 08:27:36 on Feburary 17, 2016 and on the the storage path U:\IMAGE\20160217, save a “082736.bmp” image.

U:\IMAGE\20160114.csv

**It represents that on January 14, 2016, on the the storage path U:\IMAGE, save a “20160114.csv” EXCEL spreadsheet.**

### 6.7.1.2 Save image in A mode

1. Insert OTG U disk into the Micro-USB interface at the right side of main unit, the lower left corner of the screen appears “U Disk” prompt;
2. Press  key to freeze the image;
3. Press  key, then press  key, the system issued a “tick” tone, namely the current data is stored in the EXCEL spreadsheet in the “DATA” folder of the U disk;
4. Press  key to return to the real-time status.

**Note 1: The “DATA” folder includes “EXCEL” spreadsheet. EXCEL spreadsheet is automatically named by the machine current date. For example, the machine current time is January 18, 2016; the file name of EXCEL spreadsheet is 20160118.**

**Note 2: The EXCEL spreadsheet records the results for each measurement in the order. In the EXCEL spreadsheet, the contents of each Colum respectively: Ear tag, check date, check time, measurement site P1/P2/P3, the weight of swine, lean percentage, the first layer of backfat L1, the second layer of backfat L2, the third layer of backfat L3, the sum of three layers backfat, loin thickness.  
If there is no Ear tag, the Ear tag is expressed as A000000000000.**

**Note 3: For the ear tag function, to be upgraded.**

### 6.7.2 Image viewing

Insert OTG U disk to computer to view the stored images.

## Chapter 7 Fat thickness and Lean percentage measurement

In A mode, you can measure the swine's backfat thickness and lean percentage.

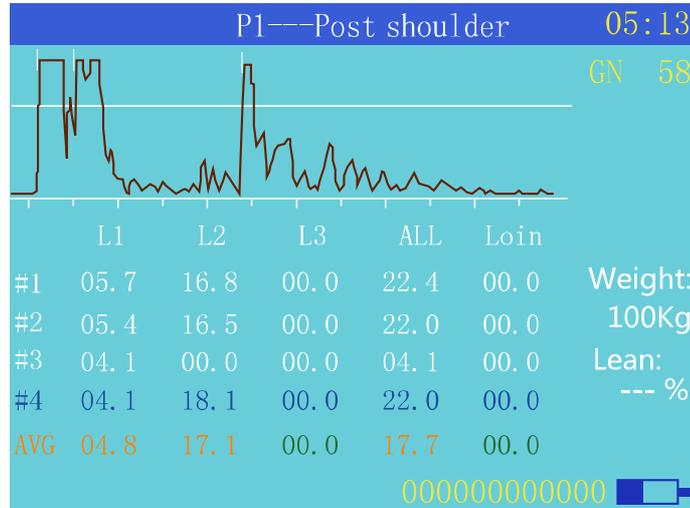


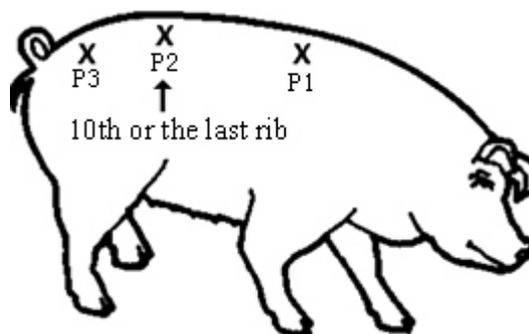
Figure: A mode interface

### 7.1 Measurement items

Name	Abbreviation	Unit
The first layer of backfat	L1	mm
The second layer of backfat	L2	mm
The third layer of backfat	L3	mm
Total thickness (the sum of L1, L2, L3)	ALL	mm
Loin thickness	Loin	mm
Average thickness	AVG	mm
LEAN	LEAN	%

### 7.2 Backfat measurement

1. Press or key, choose the desired measurement site: the trailing edge of shoulder (P1), the tenth rib (P2), the lumbosacral junction (P3);



2. Put ultrasonic coupling gel to the appropriate site of swine's back, in order to make good contact between swine skin and sound window. The probe is placed against the skin of the animal and is kept perpendicular to the back, move the probe gently, make sure no air bubbles between the skin and probe. Keep the swine quiet during the test (you can feed the swine during the test).

3. Press  key to freeze the image, it automatically displays four groups' measurement data and the corresponding waveform;
4. Press  key, choose and view the #1, #2, #3, #4 corresponding to the test waveform and measurement data.

**Note:**

1. **If AVG values are displayed in red, it indicates that the measurement error is larger, need to re-test.**
2. **Only choose P2 site, you can measure the “Loin”.**
3. **You can get accurate values of the three layers of backfat at the P2 site (the last rib). Many hogs have the thin third layer of backfat. As they increase in weight and age, the third layer becomes thicker and wider spread over the body. Measurement at P1 site (the trailing edge of shoulder: about 4-5 rib) is more difficult and inconsistent. P3 site (the lumbosacral junction, A-site) will get accurate measurement for two layers of backfat but may not give an accurate measurement for the third layers due to the muscle tissue.**

**7.3 Measurement of Swine's lean percentage**

1. Press  or  key, choose the measurement site P2 (the tenth rib);
2. Put ultrasonic coupling gel to the appropriate site of swine's back, in order to make good contact between swine skin and sound window. The probe is placed against the skin of the animal and is kept perpendicular to the back, move the probe gently, make sure no air bubbles between the skin and probe. Keep the swine quiet during the test (you can feed the swine during the test);
3. Press  key to freeze the image, to measure the total thickness and loin values (see the above the method of backfat measurement);
4. Then, press  or  key, adjust the “Weight” (range: 037~300kg), the lower right will automatically display the lean percentage.

**7.4 Measurement considerations**

1. When measuring the older animal, if necessary, it needs to remove the hair at the site and wet the skin with hot water, then apply light oil to wet the skin one minute or two before measuring. Always keep the probe perpendicular to the swine's back; errors may result if probe is at an angle. If chooses the inaccurate site, such as animal shoulder or arm, the measured result is not accurate.
2. When the probe leaves the measuring point, it needs to reapply ultrasonic coupling gel evenly to continue measurement.
3. Have a bad contact, first remove any possible manure, straw and excess hair, etc., which may cause a poor contact between the sound window and skin and leading to inaccurate measured results.
4. Recommend using dedicated ultrasonic coupling gel, also can use vegetable oil.

## Chapter 8 System Maintenance

The system maintenance should be performed by the user and service engineer. Users shall be in full charge of maintenance and operation of the system after purchasing the product.

### 8.1 Maintenance by users

#### 8.1.1 System cleaning and disinfection

**⚠Warning:** Turn off the instrument and pull out the power supply wire before cleaning every instrument of the system. It may cause electric shock if clean the system under power is on.

**⚠Warning:** There is no any water-proof device in the system. Do not splash any water or liquid into the system when cleaning or maintenance; otherwise it will cause malfunction or electric shock.

**⚠Attention:**

1. To prevent possible infection, it is advisable to wear sterilized gloves when cleaning, disinfecting the ultrasonic probe.
2. Clean the probe with sterile water to remove the residual chemicals after disinfection, because the residual chemicals may be harmful for humans.
3. Kaixin Company will not make any guarantee for the efficacy of disinfectant. Please contact the appropriate manufacturer for details.

**⚠Attention:**

1. In the process of cleaning and disinfection, avoid probe overheat (exceeding 60°C) as it may be damaged or deformed under excessive heat.
2. In the operation of disinfection, please refer to medical institutions disinfection technical specifications.

#### 1. Clean the probe

- (1) Must wear sterilized gloves to prevent possible infection.
- (2) Rinse the probe with water or soapy water to remove all contaminants, or use a soft urethane sponge to wipe the probe. Do not use brushes as it may damage the probe.
- (3) After finishing the rinsing, use a sterilized cloth or gauze to wipe the water on the surface of probe. Do not dry the probe by heating it.

#### 2. High-level disinfection

Please follow the disinfection method provided in this user's manual for disinfection.

- (1) Before disinfection, wear sterilized gloves to prevent possible infection;
- (2) You must clean the probe before disinfection. Recommend the solution to disinfect in the following table.

Glutaraldehyde-based disinfectant:

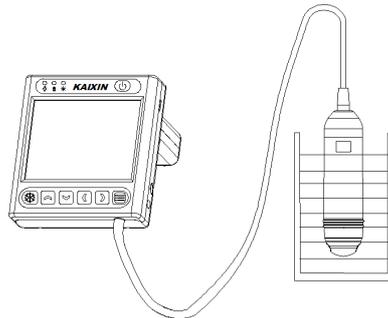
Chemical Name	Reagent Name	Step
Glutaraldehyde (2.4%)	Cidex Glutaraldehyde disinfectant	Please refer to the instructions of the solution for details.

## Non-glutaraldehyde-based disinfectant:

Chemical Name	Reagent Name	Step
Phthalaldehyde solution (0.55%)	Cidex OPA	Please refer to the instructions of the solution for details.

- **Please follow the instructions about disinfectant concentration and disinfection method, as well as the precautions about disinfectants provided by disinfectant provider. But do not rinse the cable close to probe connector.**
  - **The soaking time of probe in the disinfectant is limited to the minimum time recommended by disinfectant manufacturer (e.g., Cidex OPA manufacturer recommended minimum 12 minutes).**
  - **Please follow local laws and regulations to choice the disinfectants.**
- (3) After disinfection, rinse the probe with a large number of sterile water (about 2 gallons) for at least one minute to remove the residual chemicals. You may follow the recommended method by the disinfectant manufacturer to rinse.
- (4) After finishing the rinsing, use a sterilized cloth or gauze to wipe the water on the surface of probe. Do not dry the probe by heating it.

**⚠Attention: The waterproof grade of probe is IPX7; immersion depth is from probe's acoustic head to the part of probe shell.**



Immersion disinfection of probe (sketch map)

**⚠Attention:**

1. **It is a normal phenomenon that color of the acoustic lens may change and color of the probe label may fade away.**
2. **The regular disinfection times should be minimized as it may lead to degrade of the probe safety and performance.**

### 3. Check probe after cleaning and disinfection

- (1) Check the probe enclosure and its cable to ensure they are free of abnormality (such as scuffing, cracks or drop-off);
- (2) The sound window of probe is thin; ensure that there are no any abnormality on the sound window, such as scuffing, cracks, peeling, and bulge.

### 4. Clean the probe cable

- (1) Clean the probe cable with soft, dry cloth.
- (2) In case of die-hard blots, clean with soft cloth dipped in moderate detergent and then air-dry it.

**5. Clean the LCD screen**

Use a soft cloth dipped in glass cleaner to clean the LCD screen, and then air-dried.

**⚠Attention: Do not clean the screen with hydrocarbon detergent for example alcohol etc or OA equipment cleaning media.**

**⚠Attention: Prohibit using sharp objects to touch the LCD screen, and prohibit pressing or squeezing against the LCD screen.**

**6. Clean the control panel and shell**

Clean the instrument surface with soft, dry cloth or with soft cloth dipped in moderate water cleaning media to remove the blots, and then dry the instrument with soft, dry cloth or with air.

**7. Clean the shutter release**

- (1) Use the soft dry cloth to wipe the shutter release;
- (2) If it is difficult to wipe away the blemish, clean with soft cloth dipped in moderate detergent and then air-dry it.

**8.1.2 Replace the fuse**

Replace the fuse is to replace the power adapter.

**⚠Attention:**

1. The fuse is inside the power adapter. Fuse shall be replaced by qualified service personnel who get KAIXIN approval.
2. Before replacing the fuse, please contact KAIXIN, replace the fuse under the guidance of KAIXIN.
3. Before replacing the fuse, you must disconnect the mains supply.
4. Fuse Type: T3.15AH250VAC.

**8.1.3 Use and maintenance for the rechargeable battery**

1. Only use the battery pack (model HYLB-1997) provided by KaiXin Company; the battery pack can only be charged in the main unit. Service personnel or operator can replace the battery pack.
2. Plug the output port of adapter into the DC power input interface of main unit to charge. The charge indicator is red and blinking state when charging; the charge indicator is green and no blinking when fully charged.
3. The charging time is more than about 4 hours, over-charging or discharging will shorten the battery life; the full charged battery can be used about 5 hours.

**⚠Attention: Power indicator in the bottom of image area will appear “” and glitter continually when the electric quantity is too low. Connect the main unit to external power supply and recharge the battery, or turn off the machine to recharge.**

4. Battery is consumable; the battery cycle-life is based on the times of charge and discharge as unit. When the use time reduced significantly compared with normal conditions, the battery should be promptly replaced.
5. The excess high or low temperature will affect the charging and discharging performance, and short the battery life and capacity.

**⚠Attention: Battery is consumable; the battery cycle-life is based on the times of charge and discharge as unit. When the use time reduced significantly compared with normal conditions, the battery should be promptly replaced.**

**⚠Attention:** If do not intend to use the equipment within such a period of time, please remove the battery.

**⚠Attention:** Don't throw away the exhausted battery anywhere; especially throw it in the fire. Please deal with it according to local statutes. Use pollution degree II to deal with.

**⚠Attention:**

1. Do not throw the battery into water or be wet, which will lead to the battery leakage, explosion or fire;
2. Do not use or store the battery near the heat source, such as fire or heater, which will lead to the battery leakage, explosion or fire;
3. Do not connect the anode and cathode reversely, which will lead to the battery leakage, explosion or fire;
4. Do not heat up or throw the battery into fire, which will lead to the leakage, explosion or fire;
5. Do not connect the anode and cathode with any metal or conductor; do not transport or store the battery together with necklaces, hairpins or other metal objects, which will lead to the leakage, explosion or fire;
6. Do not hammerblow, throw or mechanically shake the battery, which will lead to the leakage, explosion or fire;
7. Do not insert the battery with nail or other spiculate objects; do not hammerblow or trample the battery, which will lead to the leakage, explosion or fire;
8. Do not weld the battery terminal directly, which will lead to the leakage, explosion or fire;
9. Do not disassemble the battery in any way, which will lead to the leakage, explosion or fire;
10. Do not charge the battery near the heat source or extra-hot environment, which will lead to the leakage, explosion or fire;
11. Do not put the battery into the microwave oven or pressure vessel, which will lead to the leakage, explosion or fire;
12. Do not mixed use the battery together with one-off battery (such as dry battery), or different capability or different model or different brand battery, which will lead to the leakage, explosion or fire;
13. Do not use the abnormal battery with particular smell or abnormal heat or distortion or turn colors or abnormal phenomena, which will lead to the leakage, explosion or fire;
14. Do stop the charge and pull out the battery from the charger at once if any abnormal phenomenon happens to the battery, such as particular smell or abnormal heat or distortion or turn colors. Otherwise, each of above will lead to the leakage, explosion or fire;
15. Do remove the battery from the near fire if any leakage or particular smell happens, which will lead to the leakage, explosion or fire;
16. If any leakage splash into eye, do not wipe the eye, instead of washing it and get help from the doctor as soon as possible. Otherwise, the eye will be injured;
17. Do not use the battery in the extremely hot environment, such as hot sunshine or in the car when it is too hot, because these will catch fire, even worsen its performance and shorten its life;
18. If use the battery beyond the listed environment on the manual, it will worsen its performance or shorten its life, even lead to extreme heat or explosion or fire.

## 8.2 Replacement of power supply cord

Before replacing the power supply cord, please contact Kaixin Company; replace the power supply cord under the guidance of Kaixin Company. Please use the power supply cord provided by Kaixin Company.

## 8.3 Troubleshooting

To ensure normal operation, users are recommended to prepare a proper maintenance and regular examination plan to regularly check on product safety performance. If any abnormality occur, timely contact International Trade Dept of Kaixin for support.

If the following problems occur on starting up the machine, try to make corrections following the method in the table. If the problem remains unsolved, contact International Trade Dept of Kaixin for support.

Trouble	Correction
Power light is off and no screen display is present when starting the machine.	<ol style="list-style-type: none"> <li>1. Check power supply.</li> <li>2. Check power cable and connector.</li> <li>3. Check power adapter.</li> </ol>
Intermittent stripe, snow, or far-field interference appears on screen.	<ol style="list-style-type: none"> <li>1. Check power supply (spark interference present).</li> <li>2. Check environment (source of interference around the machine, such as electric motor, ultrasonic atomizer, automobile, computer or other interference).</li> <li>3. Check power plug/socket of the instrument. They shall be properly contacted.</li> </ol>
Image display is not clear.	Adjust the total gain, near field and far field.
Control panel malfunction	Turn off the machine and restart it.

## 8.4 Periodic Safety Checks

To ensure the system performance and safety, it must be checked after using 1 year. When check the instrument, please consult the International Trade Dept of Kaixin or its dealers, as they need to have professional technology engineers.

1. The following safety checks should be performed at least every 12 months by a qualified professional engineer who has adequate training, knowledge, and practical experience to perform these tests.
  - Inspect the equipment and accessories for mechanical and functional damage.
  - Inspect the safety relevant labels for legibility.
  - Inspect the fuse to verify compliance with rated current and breaking characteristics.
  - Verify that the device functions properly as described in the instructions for use.
  - Test the protection earth resistance according to IEC 60601-1: Limit:  $0.1\Omega$ .
  - Test the earth leakage current according to IEC 60601-1: Limit: Normal Condition  $500\mu\text{A}$ , Single Fault Condition:  $1000\mu\text{A}$ .
  - Test the touch current according to IEC 60601-1: Limit: Normal Condition  $100\mu\text{A}$ , Single Fault Condition:  $500\mu\text{A}$ .
  - Test the patient leakage current according to IEC 60601-1: Limit: Normal Condition for a.c.:  $100\mu\text{A}$  (B), for d.c.:  $10\mu\text{A}$  (B), Single Fault Condition for a.c.:  $500\mu\text{A}$  (B), for d.c.:  $50\mu\text{A}$  (B).

The leakage current should never exceed the limit. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of the above tests, the device has to be repaired.

2. Please clean the plug of power cord at least once a year. Too much dust on plug may cause the fire.

## Chapter 9 Storage and Transportation

### Storage and Transportation

1. If the instrument is stored over 3 months, take out the instrument from the packing case, connect it to power supply for 4 hours, and then disconnect the power and place it in the case again following the direction indicated by arrows on the package. Store the case in the warehouse. Do not pile the case. The instrument case should have adequate space from ground, walls and ceiling of the warehouse.
2. Environment requirement  
Ambient temperature:  $-20^{\circ}\text{C} - 55^{\circ}\text{C}$ ; Relative humidity: 30%—93% (without condensation); Atmospheric pressure: 700hPa-1060hPa. The warehouse should be well ventilated and free of direct sunlight and corrosive gas.
3. Shockproof measures have been taken inside the packing case to allow for transport by air, railway, land and sea. The goods shall not be exposed to poor weather conditions like rain and snow, nor shall the goods be placed upside down, bumped, knocked or over-stacked.

## Chapter 10 Safety Classification

1. Classified according to electric shock protection type:  
Class I, internally powered equipment
2. Classified according to electric shock protection degree:  
Type B applied part
3. Classified according to the degree of protection against ingress of liquid:  
Main unit belong to IPX0 equipment
4. Classified according to operation safety in condition of existence of flammable anesthetic mixture with air or oxygen or nitrous oxide:  
It is neither of category AP equipment nor of category APG equipment
5. Classified according to mode of operation:  
Continuous operation equipment
6. Classified according to the protection of radio services:  
Group I Class A equipment

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