VP50

Vet Infusion Pump

Operating Instruction

Foreward

Thank you for purchasing the VP50 series infusion pump.

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

Please keep the instruction manual properly after reading, so that you can check it when necessary.

product Name: Infusion pump

Model and specification: VP50

Structure and composition: Infusion pump consists of human-machine interaction module, pump body motion control module, door and liquid clip module Measurement and monitoring module, communication module and alarm module, battery and optional accessories (stack machine Accessories, infusion rod clip, serial port communication cable, drop number sensor) composition.

Scope of application: The product is used in medical facilities for intravenous infusion, blood transfusion and enteral nutrition delivery pour.

Date of manufacture: See the label

live time: In 10 years

Random Software Version: V1.0

Release version of this IFU: 1.1

Date of Issue: 2024-07

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Statement

TooToo Company has the right of final interpretation of this instruction manual.

Only if all the following requirements are met, TooToo is responsible for the safety, reliability and performance of the product, namely:

- Assembly operation, expansion, readjustment, improvement and repair are carried out by professionals recognized by TooToo.
- All the parts involved in the replacement and the accessories and consumables are the original accessories of TooToo company.

- The relevant electrical equipment meets the national standards and the requirements of this instruction manual.
- Product operation is performed in accordance with this instruction manual.

Warranty and Repair Services

The warranty period of the purchased products shall be subject to the sales contract.

Consumables refer to the disposable consumption materials or vulnerable materials that need to be replaced regularly after each use. There is no warranty for the consumables.
The warranty period starts from the "installation date" filled in on the "Product Warranty Card" attached to the product, and the "Product Warranty Card" is the only certificate to calculate the warranty period. In order to protect your rights and interests, please fill in the insurance card after the installation of the equipment, and send the second copy of the insurance card ("company retention" copy) to the installation personnel or mail back to the user service department of the company.

Please note that the following conditions will not be covered by the warranty:

1. The customer does not fill in and return the product warranty card within 30 days after the completion of the installation acceptance.

2. The equipment serial number provided by the customer is incorrect (our company confirms the warranty with the equipment serial number).

During the warranty period, all products can enjoy free after-sales service. However, please note that even during the warranty period, the company will implement the charge maintenance service, you need to pay the maintenance fee and spare parts fee:

- Human damage
- Improper use
- Power grid voltage exceeds the specified range of the product
- Unirresistible natural disasters
- Replace or use parts, accessories and consumables not approved by or repaired by personnel not authorized by TooToo Company.
- Other failures not caused by the product itself

After the expiration of the warranty period, the company can continue to provide paid maintenance services. If you do not pay or delay in paying the charged maintenance service fee, We will temporarily suspend the maintenance service until you pay.

After-sales service unit

Company: TooToo MediTech Co., Ltd.

Address: 2401, 3A, Phase II, Smart Home, Baolong Street, Longgang District,Shenzhen, Guangdong, China.

zip code: 518118

URL: http://www.newtootoo.com

Customer service T Tel:te 86-0755-28306385

Warning

- **This product shall be used by professional clinical medical staff, or under the guidance of professional clinical medical staff. Use this product The personnel should be fully trained. No person without authorization or without training shall be allowed Line any operation.**

Explain

This specification details the use, function and operation of the product. Before using this product, please carefully read and understand the contents in this instruction manual to ensure the correct use of this product and ensure the safety of the patient and operator.

This manual describes the product in the most complete configuration, so some of the content may not apply to the product you purchase. For any questions, please contact our company.

Please place this specification near the product so that it can be easily and timely obtained when needed.

Object

This manual is suitable for professional clinical medical staff to read, the reader should have the necessary medical process to monitor the patient knowledge and work experience in order, practice, and terminology.

illustration

All the illustrations provided in this manual are only for reference, and the settings or data in the illustrations may not be completely consistent with what you actually see on the product.

convention

- Italics: The quoted sections in this specification are written in italics.
- [Character] represents a string in the software.
- : This symbol is used to represent the steps taken during the operation.

CONTENT

Chapter 1: Safety

1.1 Safety information

Warning

- **The potential hazards or unsafe operations, if not avoided, may result in death or serious personal injury or property damage.**

Take care

- **Any potential dangerous or unsafe operations that, if not avoided, may cause minor personal injury, product failure, damage or property loss.**

Pay attention to

- **Emphasize important considerations, provide instructions or explanations for better use of the product.**

1.2 Warning

- **This equipment can only be connected to power outlets with protective grounding, not removable porous socket. If the power socket is not connected, do not use the socket and use a battery to power the device.**
- **Do not be used in an oxygen-rich environment or where flammable or explosive items such as anesthetics are placed Prevent a fire or explosion.**
- **This equipment is not suitable for use in a nuclear magnetic resonance (MR) environment.**
- **Do not use a mobile multi-bit socket (MPSO) or an AC power extension**

cable. Ensure each individual ground leak
The sum of the current does not exceed the allowable limits.

- Do not open the shell of the equipment, or there is a danger of electric shock. Repair or upgrade of the equipment must be through Company trained and authorized maintenance personnel, and maintenance must be disconnected from the AC power supply.
- The infusion can not be started until all settings are correct.
- Be careful to place the power cord and various cables to avoid entanglement or choking, entanglement, or suffering jammer.
- During the infusion process, the blockage caused by the pipe knot and the filter condensation will lead to the internal pressure of the infusion pipeline The force is elevated. At this point, eliminating the blockage may lead to excessive fluid injection into the patient, so appropriate prevention should be taken measure.
- Do not contact the patient and the device interface at the same time, otherwise the patient may be harmed due to the leakage current.
- During defibrillation, do not contact the patient and other non-defibrillation devices to avoid electric shock damage
  During defibrillation, defibrillation does not affect the basic performance of the device, such as infusion accuracy, alarm, and signal transmission class.

1.3 Be careful

take care

- When this equipment is connected to the same infusion port with other infusion systems, it may occur due to mutual influence between infusion tubes Streams, or prolong the response time of the blocking alarm. Therefore, when connected to other infusion systems, it should be in the infusion tube
  The end of the road is conducted with a check valve or under the guidance of the local hospital.
- When this device is used for nutritional treatment, do not use enteral nutritional solution as intravenous injection to avoid harm to the patient.
  When performing enteral nutrient infusion, please use a disposable enteral nutrient infusion line correctly
- Please ensure continuous power supply during the use of the equipment. A sudden power loss may lead to data loss.
- The electromagnetic field will affect the performance of the equipment, so

the other equipment used near the equipment must meet the corresponding EMC requirements. Mobile phones, X-rays or MRI devices are all possible sources of interference because they all emit high intensity electromagnetic radiation.

- Please install or carry the equipment properly to prevent falling, collision, strong oscillation or other mechanical external forces. After the device falls, the user must ensure that the device works properly, otherwise the device may not be used.
- The equipment must be dried immediately after suffering from rain or splashing.
- Some of the settings are password-protected. The password change must be made by an authorized person. If you need to get the password access features, please contact someone involved.

1.4 Note that

Pay attention to

- The software of this equipment is developed according to the requirements of YY / T 0708 standard.
- This device has the power-loss storage function. After abnormal power interruption, the alarm limit setting and history record before power failure can be saved, and the preservation time is the same as the life of the machine.

  After turning on, the alarm limit setting before power interruption can be automatically loaded.
- This specification describes the product according to the most complete configuration, your purchase may not have certain products Configuration or functionality.

1.5 Equipment Symbol

Your device does not necessarily have all of the following symbols.

	Follow the operating instructions		Sequence number
	alternating current (AC		Input / output
	Alternating Current direct-current		direct current
	USB joggle		cell
IP33	Prevent solid foreign body with diameter of not less than 2.5mm and prevent water		Defibrillation prevention type CF application part
	date of manufacture		manufacturer
EC I REP	Authorized representatives of the European Union		temperature limitation
	Pressure limit		Humidity limit
	upward		Avoid rain

	Fragile, put carefully		The limit of the number of stacking layers
	Use the pollution-free method for the treatment		Environmental protection service life of electronic products (20 Years)
	take care		halt
	nonionizing radiation		await the opportune moment

Chapter 2 Equipment Introduction

2.1 Intended use

The product is used in medical facilities for intravenous infusion, blood transfusion, and enteral nutrition infusion.

This infusion pump is suitable for adult, pediatric and neonatal animal in all clinical departments.

The intended use occasion of this infusion pump is a medical institution with health care capacity, including: emergency room, ICU, general ward, operating room, observation room, clinic and nursing home.

Pay attention to

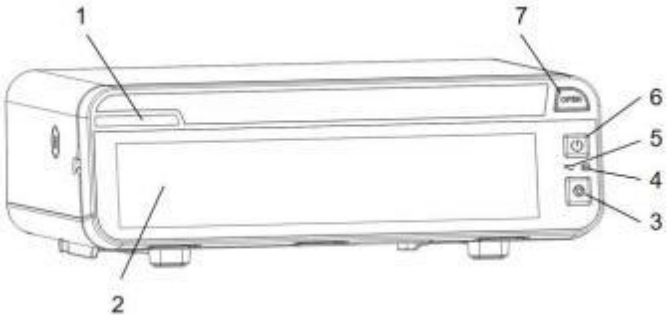
- **This equipment shall be used by professional clinical medical staff, or under the guidance of professional clinical medical staff. Personnel using this equipment shall receive adequate training. No person without authorization, or an untrained person shall perform any operation.**

2.2 contraindications

none

2.3 Host

2.3.1 Front view



(1) Alarm lights

The alarm light indicates the level of the alarm with different colors and flashing frequencies:

Advanced alarm: red, fast flicker frequency.

Low-level alarm: yellow, often bright is not flashing.

(2) Display screen

(3) Stop the key

During the infusion, if an emergency occurs, if the screen cannot be unlocked, press this button to stop the infusion.

(4) Battery status indicator lamp

The Green light is always on: the battery is charging.

Green light flashing: the device is battery-powered.

Off: No battery is installed, or the device is not switched on to the external power supply.

(5) External power supply indicator light

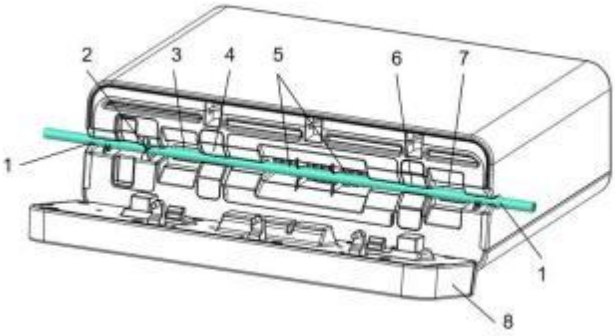
Bright: The device has been connected to the external power supply.

Out: Device is not external powered on.

(6) main switch

(7) The door button

Press the open door button to open the pump door.



(1) Infusion tube fixation tank

For the fixation of the infusion lines.

(2) Electric liquid stop clip

To block the flow of fluid in the infusion tube.

(3) Lower pressure sensor

Test the down pressure of the infusion line.

(4) Lower air sensor

Test the bubble size in the infusion tube.

(5) Extrusion of the components

Used to push the fluid in the infusion set flowing at a set flow rate.

(6) Upper air sensor

Test the bubble size in the infusion tube.

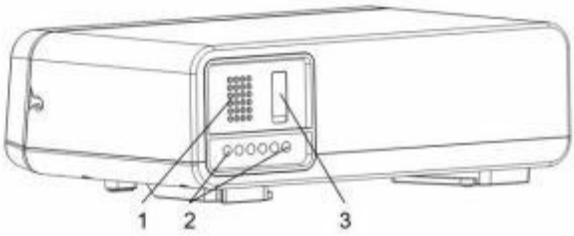
(7) Upper pressure sensor

Test the upper pressure of the infusion tube.

(8) Pump door

Open or close the pump door when installing or replacing the infusion set.

2.3.2 Rear View



(1) Speaker

Used to sound alarm and prompt.

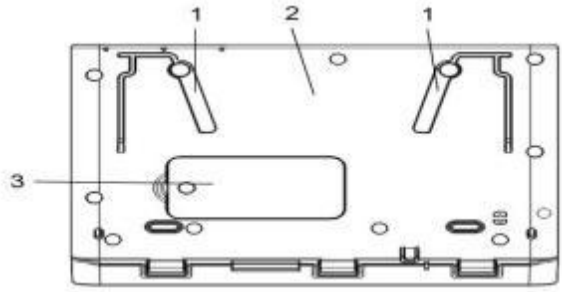
(2) Multifunction interface

As a DC power supply input interface.

(3) The USB interface

For the connection to the USB devices.

2.3.3 Base view



(1) Stack of the machine guide rail

Used to install the pump to the folding machine handle.

(2) Tighten the clip mounting slot

Used to install the pump to the stening clamp.

(3) Maintain the mouth cover plate

2.4 Screen display

Use different modes of infusion, the interface will be different. The following figure shows the display of the infusion operation interface in speed mode:

(1) Patient information area

Patient type, sex, bed number, and patient name are shown.

(2) Infusion status display area

Displays the current mode, brand information, drug name, infusion run indication, and major infusion parameters.

(3) Infusion status display area

Displays the other parameters and the pressure status.

(4) Alarm information display area

Display the alarm status, alarm icon, alarm information or prompt information.

(5) System information area

Displays the battery, the network, and the time.

(6) Key area

Different interfaces can display different buttons, please refer to the details2.4.3 Operation buttons.

(7) Dynamic blocking of the pressure display area

Display the pressure state of the infusion line through different icons.

- Green: normal pressure
- Yellow: close to the blocking alarm pressure
- Red: blocking alarm pressur

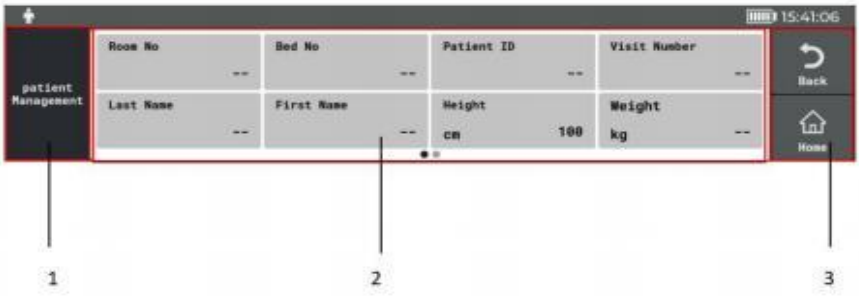
2.4.1 Interface symbols

The following table shows the symbols and meanings of the interface display:

symbol	explain	symbol	explain
	The battery is seriously insufficient and needs to be charged immediately, otherwise the device will automatically turn off		Night mode
	The battery works normally, and the solid part represents the remaining power of the battery		The device is charging
	The battery level is low, and it needs to be charged		The alarm was uspended

2.4.2 Menu style

The styles of the various menus are basically similar, so see the picture below:



(1) Menu title: A summary of the current menu

(2) Submenu or set item

(3) Action key: Click to start an operation

2.4.3 Operation buttons

The operation buttons on the interface are some graphic buttons displayed on the screen. Clicking on an operation button can start an operation. The following table lists all the operation keys provided for this device.

Key icon	Key name	function	Key icon	Key name	function
	The alarm is suspended	Stop the alarm		Alarm reset	Confirm current alarm
	lock screen	Lock the touch screen		exhaust	Start the exhaust
	Cumulative quantity	Enter the [Cumulative Volume]menu		menu	Enter the menu
	withdraw from	Return to the main interface		Quick push	Start fast push
	firing	Start infusion		cease	Stop infusion
	return	Return to the superior menu or return to the parameter settings interface		main interface	Return to the main interface

	set up	Enter the Standby Time] setting menu or return to the parameter setting interface		cancel	Cancel the shutdown and return to the main interface
	shut down	Close the device		await the opportune moment	Enter standby

2.4.4 Use the touch screen

You can complete the information input through the touch screen. Click on the touch screen to easily and quickly complete some exercises do.

In order to prevent misoperation of the touch screen, during the set lock time, the device can be from moving into the lock screen state.

You can swipe down the top of the screen and select [Lock] to lock the touch screen. After the touch screen is locked, click the icon on the touch screen, and the unlock slider appears on the touch screen. At this point, follow the slide block to unlock the touch screen 

Pay attention to

- **The touch screen must be dried after the rain or splashing before use.**

2.4.5 Use a soft keyboard

This device provides a soft keyboard for information input, and the soft keyboard functions are as follows:

- Select the characters on the keyboard for input.
- Use the delete key to delete the previous character 
- Use the upper file key to switch between the English upper and lower case letters 
- Use the confirmation key to complete the entry, and turn off the soft keyboard
- Use the space bar to enter the space

Chapter 3: Equipment Preparation

3.1 Safety information

Warning

- **Please use the installation attachment specified by TooToo.**
- **The software copyright of the equipment belongs to TooToo Company, without permission, no organization or individual by any means or Form of tampering, copying or exchange.**
- **All analog and digital devices connected to this equipment must be certified by the specified standard and all equipment shall comply**

Connect the system requirements according to the standard valid version. Responsible for connecting the additional equipment to the input and output signals

The personnel of the port is responsible for whether the system meets the relevant standards. If any doubt, please contact any company.

- **When the equipment is connected with other electrical equipment with a specific function combination, if from the specifications of each equipment**

It is impossible to determine whether the combination is hazardous (e. g. hazard of electric shock due to aggregation of leakage current)

Please contact the company or hospital to ensure all equipment in the combination

Security will not be compromised.

- **Please that the device is secured secured. Changes in the installation position and severe vibration may affect the infusion accuracy.**

take care

- **The equipment shall be installed by the personnel designated by the**

Company.

- **Equipment may be contaminated by microorganisms during storage, transportation and use, please confirm whether the package is intact before use,**
  If found damaged, do not use it.

Attention

- **Please keep the packing boxes and packaging materials for use during later transportation or storage.**

3.2 Environmental Requirements

The operating environment of the equipment must meet the requirements of the environmental specifications specified in this specification.

The use environment of the equipment shall also reasonably avoid the existence of noise, vibration, dust, corrosive or flammable, explosive substances, etc. If installed in the chassis, allow sufficient space at the front and rear of the chassis for operation, maintenance and repair. In order to make the air circulate smoothly to achieve good heat dissipation effect, a space of at least 5cm should be left around the equipment.

When the device is transferred from one environment to another, the device may condense due to differences in temperature or humidity. At this point, the condensation must disappear before use.

Attention

- **Please ensure that the equipment works under the specified environmental requirements, otherwise the technology claimed in this specification and may lead to unexpected consequences such as equipment damage.**

3.3 Installation

3.3.1 Install the tight clamps

Use fastening clamps when necessary to install the pump to the horizontal or vertical bar of the tower or the infusion bracket. For the installation method of the clamp, refer to the installation insert.

3.3.2 Overlay of multiple pumps

When the equipment needs to be transported or multiple equipment

need to be superimposed together, the stacking bracket can be used. For the installation method of the folding bracket, please refer to the installation

instructions of the stack bracket.

Pay attention to

- **Before fixing the equipment, the stability of the fixing bracket shall be checked.**
- **When installing multiple superimposed pumps, it is necessary to install fastened clips for each pump and then fix them to the lifting tower or infusion rod successively**
  falling-rising tone.

3.4 Equipment preparation

Please read the instructions carefully before using the equipment and be familiar with the performance, operation method and precautions of the equipment.

3.4.1 Use of the AC power supply

This equipment is powered by an AC power supply. Before connecting the AC power supply, please confirm the following items:

. The voltage and frequency of the AC power supply are the same as the voltage and frequency marked next to the power supply plug.

. There is no drug liquid and other residues in and around the interface at both ends of the power cord.

- No liquid and other residues in and around the AC power interface of the equipment.

Connect the AC power supply as follows:

1. Connect one end of the power cord to the AC power interface on the device.
2. Insert the other end of the power cord into the AC power outlet.
3. Check whether the AC power indicator light is on to ensure that the AC power connection is normal.

The AC power indicator is located on the right side of the display. When the AC power is not on, the indicator is not on. After the AC power is on, the green indicator is on.

Warning

- **The power cord supplied with the machine must be used.**
- **Before connecting the AC power supply, confirm whether the voltage and frequency of the AC power supply rate with the equipment identification or manual.**
- **Do not contact the power plug with your wet hands. If the ends of the power cord or the AC power interface of the device or weeks**
- **With liquid or other residues, it should be thoroughly removed and completely dried before connecting the power supply, otherwise it may be induced safety accidents.**
- **Use the external protection wire when installation or the integrity of its wiring, otherwise can cause electric shock damage to both the patient and the operator.**

3.4.2 Battery charging

To maintain good battery performance, fully discharged or near fully discharging batteries must be charged as soon as possible. After connecting the AC power supply, the device can be charged automatically charged. When the device is used with Software, the device can also be charged if Software is connected to an AC power supply.

Pay attention to

- **Only the battery can be charged using this device or the Software.**
- **Before using the battery, check that the battery has sufficient power. Recharge the battery when needed.**

3.4.3 Set the screen brightness

When using battery power, you can set a lower brightness to save the battery power. Set the screen brightness steps as follows:

1. wipe down from the top of the screen to select [Menu] Select [System Settings].
2. Set [Brightness] and [Battery Brightness]. When the device switches external power and battery power, automatically adjust the screen brightness according to the settings.

3.4.4 Set the time and date

When using the equipment for the first time, the system time and date should be set first to ensure that the history record can be correctly recorded. Set the system date and time steps are as described below:

1. Step down from the top of the screen to select [menu] Select [User Maintenance] Enter maintenance password selection [confirm].
2. Select [Time Setting] to set the current date and time.

Pay attention to

- **After changing the time format or the date format, the history will automatically update its display format.**

Chapter 4 Preparation

4.1 Infusion: quick guidance for fluid infusion

1. Power on: Press the power switch button 
2. Install the infusion set: Reference for details4.3 Install the infusion set.
3. Set the infusion parameters: Reference4.4 Start of the infusion.
4. If required, exhaust: specific reference4.5 Exhaust.
5. Connect the infusion tube to the patient end.
6. Start the infusion: select the key. 
7. End of the infusion: Select the key. 

4.2 Equipment Preparation

The equipment adopts full extrusion technology. In order to ensure the accuracy of the infusion, the following items shall be confirmed before starting the infusion:

- The device is placed on a smooth level, or securely mounted to the infusion bar through a tight clamp, or already in the insert box slot of the Software.
- The device has been connected to the AC power socket with protective grounding. For details, see 3.4.1 Usage exchangesource
- Press the power switch button to start the power on, and the equipment will automatically enter the installation guide interface. If necessary, select [return] **Enter the infusion parameter setting interface or drug selection interface, set the infusion parameter or select the drug to be infused, and then install the infusion set.**
- If battery-powered, make sure that the battery has enough power.

Warning

- **Before use, the user must check the equipment, connecting cables and accessories to ensure that they work properly and safely.**

- **Do not use the equipment if it is damaged or does not work properly.**

Please contact the maintenance personnel or the work with us immediately.

Attention

- **In order to ensure a clear view of the main interface of the device, it is recommended that you operate within one meter of the device Use this device.**
- **This device uses the power supply plug and the AC power supply to split off. Please place the device in the convenient plug and unplug power plug Where.**

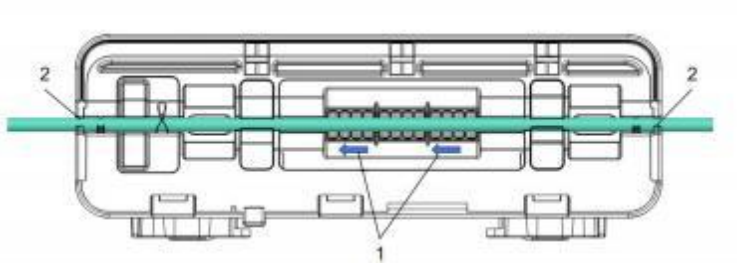
4.3 Install the infusion set

1. Close the roller on the infusion set.

2. Press the door button, and the pump door opens automatically.

3. Straighten the infusion tube according to the liquid flow direction instruction (1), and then put it into the infusion tube fixation tank (2). Make sure to lose

The fluid tube is fixed in the fixation tank (2).



4. Close the pump door.

Warning

- **To ensure the accuracy of bubble detection, check and remove the remaining placement tank in the infusion tube before installing the**

  infusion tube the liquid medicine inside.
- **When installing the infusion set, be careful not to touch the fluid clamp with your hand to avoid hand clamp.**
- **Recommend standard disposable pump extension tubes and infusion sets with Luer interface.**
- **Place the device at the same heart level as the patient. The smaller the height difference between the device and the animal heart, the lose The more accurate the pressure detection in the fluid line is.**
- **It is recommended to use the infusion sets and infusion lines recommended by the manufacturer. If the infusion set is not recommended by the manufacturer, then need Contact the company for calibration and then confirm the infusion performance on this device. After the confirmation, can make Use, otherwise it will affect the infusion performance of the equipment, such as accuracy, pressure detection and alarm function.**
- **To ensure the accuracy of the flow rate and alarm, confirm the brand and specification of the infusion set before using the device Calibrated in this equipment.**
- **Disposable attachments can only be used once, and repeated use may cause a decrease in performance or cross-infection.**

Pay attention to

- **When closing the pump door, be careful to prevent the hand from being clamped.**
- **After installing the infusion set, confirm that the infusion set has been stuck in the infusion pipe set tank, and should not be stuck to the outside of the tube tank.**

4.4 Start of the infusion

After the infusion set is successfully installed, the device automatically enters the setting interface:

1. Select the drug to be transfused. If the selection screen does not show the drug you need, please exit the selection or select [Other].
2. Set the infusion mode, if necessary. For the introduction of the infusion mode, please refer toChapter 8: Understand the infusion modetype.
3. Set the infusion parameters.
4. Conduct an exhaust once, if necessary. Specific reference4.5 Exhaust.
5. Connect the infusion line to the patient.
6. Confirm the following information
   - ◆ Check the order and confirm that the infusion parameters are consistent with the order.
   - ◆ Confirm that the selected infusion set brand model is consistent with the currently used infusion set brand model.
7. Select the key to start the infusion 

Warning

- **Before connecting the patient, ensure that the infusion line is exhaust and installed in the device.**
- **Before starting the infusion or after stopping the infusion, check whether the drip pot has liquid drops. If so, immediately stop using the device and contact customer service for handling.**
- **The pump door cannot be opened in the infusion and the opening button is invalid.**
- **If the type of infusion set is "nutrition" or the selected drug type is "enteral nutrition", the title bar of the interface always displays the prompt information of [bubble detection off]. When starting the infusion or fast push, the dialog box of "[enteral nutrition] infusion, bubble detection off" will pop up.**
- **Monitor monitor set, extension tube and pump connection to the patient, and drug information and follow**
  The method of this instruction manual is used for infusion.

4.5 Exhaust

Before starting the infusion set. If manual venting is not performed before installing the infusion set, proceed as described below.

1. Confirm that the infusion line is not connected to the patient.

2. Swipe your finger down from the top of the screen and select the key 
3. Select the key to start the exhaust gas 
4. If required, set [exhaust velocity].
5. After the exhaust gas ends, select the key to exit the exhaust gas. 

Pay attention to

- **If necessary, the exhaust flow rate can be changed after starting the exhaust. Initial exhaust flow rate is 1200ml / h or when Maximum flow rate supported by the front infusion set (take small).**
- **The volume of exhaust is not included in the cumulative volume.**

4.6 Quick push

When the treatment is needed, the fast push function can be used to accelerate the delivery of a certain amount of liquid to the patient end. When pushing fast, ensure that the pump is connected to the patient normally.

Pay attention to

- **The infusion volume of the fast push is calculated into the total infusion volume, so the remaining inflow amount after the fast push will be reduced by the fast push The amount of liquid**

4.6.1 Set the fast push flow speed

Refer to the following steps to set the fast push flow rate:

1. Fwipe down from the top of the screen to select [Menu] Select [Infusion Settings].
2. Set the [fast push flow speed].

4.6.2 Automatic fast push

In the infusion run interface or parameter setting interface, refer to the following steps:

3. Select the key on the main interface 
4. Set the infusion amount of this fast push in the pop-up soft keyboard.
5. Click on the key to start the automatic fast push 

After reaching the set fast push amount, the pump automatically exits the fast push and continues the previous infusion. If necessary, select the key to stop this fast push.

Pay attention to

- **If necessary, you can choose the [Fast push flow speed] area to change the flow speed of the fast push run.**

4.6.3 Manual fast push

In the infusion running interface or parameter setting interface, refer to the following steps:

1. Select the key on the main interface 
2. The long button starts the manual fast push 
3. Release the key and end the manual fast push. When the pre-set fast push amount limit is reached, the device automatically stops the manual fast push 

Pay attention to

- **The manual fast push limit is set in the [User Maintenance] menu, please see12.8 Fast push limit setting.**

4.7 Change the infusion parameters

During the infusion run, the flow rate, dose speed, target control concentration, and drug name can be changed without disrupting the infusion, namely the online titration:

1. Select the parameter area to be changed in the infusion run interface.
2. Reset the infusion parameters in the pop-up window to ensure that the modified parameter values are consistent with the medical order. Changing other infusion parameters requires suspending the infusion as follows:

1. At the infusion run interface, select the key to pause the infusion

2. Select the parameter area to be changed, and set the infusion parameters according to the order to ensure that the modified parameter values are consistent with the order.
3. Select to confirm the change.
4. Select the key to restart the infusion

4.8 Suspension of the infusion

During the infusion, if necessary, select the key at the main interface. During the infusion pause, select the key to continue the infusion

4.9 Keep the vein open (KVO)

After the pump completes the set preset amount, it can continue to run at the set small flow rate to keep the animal veins open and prevent blood return or blood vessel blockage.

The default KVO flow rate is 1ml / h and can be reset in the following steps:

1. Fwipe down from the top of the screen to select [Menu] Select [Infusion Settings]
2. Set the [KVO flow rate]

Pay attention to

- **If the set KVO flow rate is greater than the current infusion flow rate, the pump continues at the current flow rate after the preset infusion is Complete transfusion.**
- **The volume of KVO will be included in the cumulative volume**

4.10 Replace the infusion bottle (bag)

Please refer to the following steps to replace the infusion bottle (bag):

1. To prevent the patient from free flow, please close the roller of the infusion set before replacing the infusion bottle (bag). If in the process of infusion, you should first press the button to stop the infusion, and then close the rolling wheel.

2. Remove the installed infusion bottle (bag), and then install it again. **Pay attention to**

- **After changing the infusion bag, please confirm the infusion status of the pump. If the pump is in the KVO state, the transmission needs to be reset**
  Restart the infusion with the fluid parameters.

4.11 Remove the infusion set

1. Select the key to use the main interface to stop the infusion.

2. Close the roller and disconnect the infusion set from the patient.

3. Press the key to open the pump door OPEN

4. Hold the infusion tubes on both sides of the pump and remove the infusion tube.

5. Select the next step as required:

- Continue treatment: Refer to 4. 3. Install the infusion set and 4. 4 to start the infusion.
- Enter standby: refer to 4.1 3 to enter standby.
- Shutdown: reference 4.1 4 shutdown.

Warning

- **To prevent fluid flow due to gravity, confirm that the roller is closed before removing the infusion set.**
- **It is recommended to replace disposable infusion sets every 24 hours (or follow national health regulations/ according to product instructions). If a non-recommended infusion set is used, it is recommended to change the extrusion position once within 4 hours.**

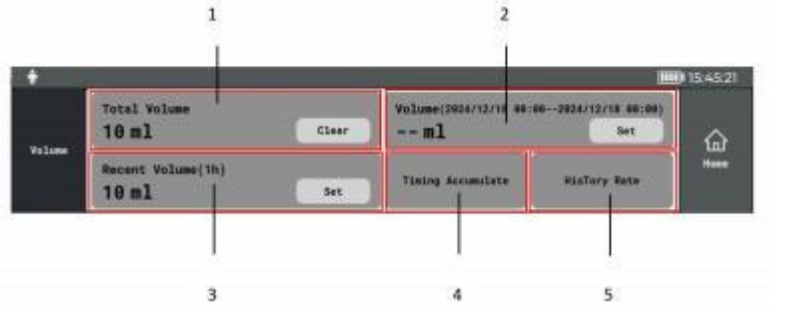
- **It is recommended to replace the disposable enteral nutrition infusion lines every 24 hours.**

4.12 Check the cumulative amount of infusion

Cumulative infusion volume is how much fluid the pump has infused to a patient over a certain period of time. This device can setting the time period or time interval to view the animal infusion volume according to the time period or time interval.

Select any of the following methods to view the accumulated infusion volume of the pump over a certain period of time:

- Swipe your finger down from the top of the screen and select [Cumulation].
- Select [Cumulants] at the pause interface.



(1) [Total cumulants]: (display> 100000 when over 100000).

Select [Clear] clear cumulative.

(2) [Cumulative volume]: the cumulative infusion volume in the set time period.

You need to set the required time period first, and then view the cumulativ infusion volume during that time period.

(3) [Recent cumulative amount]: The cumulative infusion amount within the set time.

(4) You need to select the [setting] setting time first, and then view the cumulative infusion volume during that time.

(5) [Timed cumulative volume]: cumulative infusion volume within the set interval.

You need to set the [timing interval] and then view the cumulative infusion volume for the set interval period.

(6) [Historical flow rate]: View the historical flow rate

Pay attention to

- **The cumulative amount cannot be cleared from the infusion.**

4.13 Enter the standby machine

If you do not need to use the device infusion, and do not want to shut down, you can use standby mode. In the non-infusion state, long press the power switch key, and then select [standby] to enter the standby mode in the pop-up dialog box. Swipe your finger down from the top of the screen and select [Standby].

When the device is in standby mode, select the time to exit the standby mode. When the set standby time is reached, the device automatically exits the standby mode. The maximum standby time can be set for up to 24 hours 

If you need to manually exit the standby mode, select 

4.14 Shut-down

Conduct the following checks before the shutdown:

1. Confirmation can end the infusion to the patient.
2. Verify that the device is disconnected from the patient side.
3. Confirm that the infusion set has been removed.

Long press the power switch key, and then select [Shutdown] to close the device in the displayed dialog box.

Pay attention to

. In some special circumstances, if you cannot shut down normally, you can hold down the power switch for no less than 10 seconds.

. Forced shutdown may cause data loss or damage of the device and is not recommended.

. Shut off the power switch will not cut off the AC power supply of the equipment. If you need to completely disconnect the power supply, please remove the power plug

Chapter 5 Use the Software

This device only supports use with the Infusion information collection system (hereinafter referred to as Software). For the use of Software, see the Infusion Information Acquisition System Instructions.

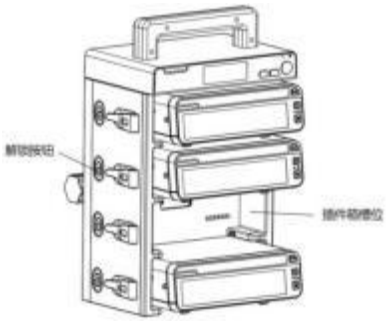
5.1 linkage Software

When connecting the pump and Software, keep the pump horizontally to the plug-in box slot and push the pump into the plug-in box slot. A click is heard when the pump is locked.

To pull the pump out of the plug box slot, press the side unlock button and remove the pump.

Take care

- **After the device is connected to the infusion information acquisition system, the alarm sound of the device will not be closed. This device is still the alarm sounds.**



Chapter 6: Alarm Alarm

6.1 Alarm safety information

Warning

- **Different alarms are used for the same or similar equipment in the same area (e. g. intensive care unit or operating room)**
  Set and default settings may be potentially dangerous.
- **The alarm settings for different pumps in the same area may vary to accommodate the patient. At the beginning of the infusion before, check whether the alarm setting is suitable for the patient receiving infusion.**
- **During a pause, the device will not make an alarm sound even if a new alarm is triggered. Therefore, you must carefully select whether to pause the alarm sound. Check the device status frequently after suspending the alarm sound.**
- **You cannot rely solely on the audible alarm system for patient infusion monitoring. Adjust the alarm sound to a lower volume, there may be risks present. The alarm volume should be ensured in the current environment, and close attention should be paid to the actual patient The bed condition.**
- **When changing the alarm sound mode, the risk should be fully assessed, as the current user may have been used to the past setting the alarm sound, select the new alarm sound may cause the operator to detect the alarm in time.**

6.2 About the alarm

6.2.1 Alarm level

According to the severity of the alarm, the alarm of this equipment can be divided into advanced alarm and low-level alarm.

6.2.2 Alarm mode

When an alarm occurs, the equipment will use different sounds, lights, symbols and colors to indicate different levels of alarm. The specific instructions are as follows:

Alarm level	Alarm light color	The lamp flashing frequency	Alarm sound interval	Warning message	Alarm level mark	duty cycle
Advanced alarm	red	2.0 ±0.6Hz	5s (± 2 seconds)	White text and symbols,a red background color	!!!	20% ~ 60%
Low-level alarm	yellow	Often bright	5 Seconds (± 2 second)	Black text and symbols, yellow background color	!	20% ~ 60%

Pay attention to

- **The sound of the alarm sounds and the prompt sounds is different.**
- **When multiple alarms occur at the same time, the alarm information is displayed in turn in the alarm information area, and the alarm light and alarm sound are pressed at the highest level of all current alarms.**

6.3 Alarm interface

After the alarm occurs, the main screen displays the alarm interface. The alarm interface contains help information or pictures to help you identify the reason of the alarm. As shown in Figures 6-1,6-2.

Figure 6-1 Low-level alarm

Figure 6-2 Advanced alarm

Pay attention to

- **The alarm screen always displays the alarm with the highest current priority.**

6.4 Alarm reset

After the alarm is generated, click [Alarm Reset] to confirm the current alarm and reset the alarm. After the alarm is reset, it has the following characteristics

- The alarm sound and alarm interface of this alarm are blocked.
- The alarm text message before the indication that the alarm has been confirmed.

For the following alarms, all the alarm signals (alarm sound, text information, alarm light) are clear after [alarm reset) is pressed

- [Infusion completed]

- [KVO accomplish]
- **[End of standby time]**

6.5 Pause the alarm sound

The pump can enter the alarm sound pause state after the following operation:

- Select the key in the alarm interface 
- Swipe down from the top of the screen with a single finger and select [Alarm Pause] 

The alarm sound is suspended with the following characteristics:

- The alarm sound pause time is 2 minutes.
- During the alarm sound pause, the interface title bar displays the icon. 
- If a new alarm is generated during the pause period, the new alarm sound will also be suspended.

The following situations: the device exits the alarm sound pause status:

- A fixed pause time of 2 min upon arrival.
- Press the sound pause button again 

Pay attention to

- **Except for [battery depletion], other alarms can be pressed to pause the alarm sound.**

6.6 Set up the alarm sound

6.61 Set the alarm volume

To set the alarm volume is as follows:

1. Fwipe down from the top of the screen to select [Menu] Select [System Management] selection
   [Alarm volume].
2. Set the [alarm volume]. The alarm volume ranges from 1 to 4. 1 is the lowest volume, and 4 is the highest volume.

6.7 Alarm handling

Warning

- **After the alarm occurs, please confirm the operation status of the pump and handle it as soon as possible. If the alarm is found to inconsistent with the actual situation,Need to contact the maintenance personnel for handling .**

Warning message	Alarm level	cause	the way to deal with a situation
[Infusion completed]	tall	After the infusion.	• Click the reset alarm button to eliminate report to the police • Exit mode
[Battery is running out]	tall	The battery runs out when the battery is powered.	Connect the pump to the external power supply.
[Infusion tube falling off]	tall	During operation, fluid tube detachment was detected.	Reinstall the infusion tube fluid status
[No tube selected]	tall	When clicking on the running mode, the corresponding needle tube is not selected.	• Click the reset alarm button to eliminate report to the police • Choose the tube

[Upper block]	tall	During the infusion process, the fluid supply line (the infusion line between the donor site and the	• Click the reset alarm button to eliminate  report to the police • Check the blockage of each pipe interface

		equipment) is blocked.	circumstances. • The pressure value returns to the normal value
Warning message	**Alarm level**	**cause**	**the way to deal with a situation**
[Lower block]	tall	During the infusion, the patient line (the line between the device and the patient) becomes blocked and the blocking pressure reaches the set threshold.	• Click the reset alarm button to eliminate report to the police • Check the blockage of each pipe interface circumstances. • The pressure value returns to the normal value
[Pipeline air bubble alarm]	tall	During the infusion, the single bubble size exceeds the set single bubble alarm threshold.	• Disconnect the patient and remove the pipeline air bubbles. • Confirm that the individual bubble threshold value is No reasonable.
[Cumulative bubble]	tall	During the infusion, the cumulative bubble size exceeds the set cumulative bubble alarm threshold.	• Disconnect the patient and remove the pipeline air bubbles. • Confirm that the individual bubble threshold value is

			No reasonable.
[Pump door open]	tall	1. When the door is open, use it for infusion 2. The door opens during the infusion	• Click the reset alarm button to eliminate report to the police • close
[No infusion set installed]	tall	When closing the pump door, the pump detects that the infusion tube is not installed in place.	Close the roller to block the infusion and then reference4.4, installation Liquid device Reinstall the infusion set.
[Infusion position is wrong]	tall	Test the infusion motor is not in place.	• Click the reset alarm button to eliminate report to the police
[Door motor failure]	tall	1. Not calibration the sliding rheostat. 2. Calculate the step exception by sliding the rheostat after calibration.	Please contact the maintenance personnel for handling.
[Motor failure]	tall	If the angle and the step is calculated every second-forward and reverse	Please contact the maintenance personnel for handling.
Warning message	**Alarm level**	**cause**	**the way to deal with a situation**
[Sliding rheostat failure]	tall	The sliding rheostat adc value was detected	Please contact the maintenance personnel

		above the maximum or minimum threshold	for handling.
[Pressure sensor failure]	tall	Pressure value is greater than adc4000 or less than 500	Please contact the maintenance personnel for handling.
[Angle sensor failure]	tall	Failed to read the angle data	Please contact the maintenance personnel for handling.
[Communication anomaly]	tall	No heartbeat packet alarm is received, and the communication is abnormal	Please contact the maintenance personnel for handling.
[Motor speed error]	tall	The motor speed or direction is inconsistent with the setting	Please contact the maintenance personnel for handling.
[brand identity]	low	The installed infusion line was detected	Select Brand \ to return to the previous level
[KVO move]	low	Enter the KVO mode after the completion of the infusion	Exit from the KVO status
[Low battery level]	low	Low battery capacity.	Connect the pump to the external power supply.
[Battery is fully charged]	low	Charge IC prompt charge.	• Click the reset alarm button to eliminate report to the police
[AC access]	low	Access to the power	• Click the reset alarm button to eliminate report to the police • Remove the power

			supply • Other alarms for the battery
[Communication pull out]	low	Pull out the power supply	• Click the reset alarm button to eliminate report to the police • Access to the power • Other alarms for the battery
Warning message	**Alarm level**	**cause**	**the way to deal with a situation**
[Reinstall the infusion line]	low	Before the boot has been installed on the premise of infusion.	Close the roller to block the infusion and then reference4.4, installation Liquid device Reinstall the infusion set.
[lock screen]	low	Lock the screen time to arrive.	Unlock.
[no-operation]	low	No operation was performed during the set no-operation time.	• Click the reset alarm button to eliminate report to the police • Any location of the screen
[The standby is over]	low	The standby time is over	• Click the reset alarm button to eliminate report to the police

Pay attention to

- **The pump stops running after the advanced alarm is triggered in the running state.**
- **After the low-level alarm is triggered, it will not affect the pump infusion, and the pump continues to infusion.**
- **After the system sends out the [battery depletion] alarm, the pump stops the infusion, and the shutdown delay is at least 3 minutes.**
- **Under the specified operating conditions (the new battery at ambient temperature of 20℃ ± 2℃, flow speed of 25ml / h, screen bright Set to 2), it can run for at least 30 minutes after the first [low battery level] alarm.**
- **When blocking occurs, the device will stop the infusion and trigger the [blocking] alarm. After triggering the alarm, the motor falls down turn to release the line pressure. Prevent additional shock dose to the patient after obstruction.**

6.8 Block the alarm

The device collects the signal through the pressure sensor, calculates the pressure value through the CPU, and compares the pressure value with the blocking pressure threshold value set. When the pressure value is greater than the set threshold value, the pump triggers the [blocking] alarm and stops the infusion at the same time.

Refer to the following steps to set the blocking pressure:

1. Wipe down from the top of the screen to select [Menu] Select [Infusion Settings].
2. Set the [blocking pressure].

The response time of the blocking alarm is related to the brand and specification of the infusion sets.

After the blocking alarm triggers, the pump needs to manually restart the infusion when the blocking pressure is relieved.

Attention

- **When the blocking alarm occurs, the roller needs to be closed immediately to block the liquid path between the extension tube and the patient to prevent automatic restart after the failure, the line fluid was aspirated.**

Pay attention to

- **At 0.1ml / h, the blocking alarm response time may be respectively Above 1 hour and 20.5 hours. When a low flow rate infusion is required, it is recommended to lower the blocking gear or use an injection pump.**

Chapter 7 Menu settings

7.1 Menu setting item

menu item	explain
Infusion setting	see7.2 Infusion settings.
Department management	see7.3 Department management.
System Settings	see7.4 System Settings.
Check the doctors advice	Check the order for details.
patient administration	See Chapter 10: Patient Management.
Discharge the patient	See Chapter 10: Patient Management.
User maintenance	See Chapter 12 User Maintenance Settings.

7.2 Infusion setting

The infusion settings menu provides infusion-related parameters and alarms that can be set. The steps to enter the [Infusion Settings] menu are as follows:

1. Wipe down from the top of the screen to select [Menu] Select [Infusion Settings].
2. Select the settings item that you need.

menu item	Windows default	Set the range	explain
Current pressure	/	/	Display the current line pressure.

Blocking pressure	450mmHg	See A. 5 Infusion Control And measurement	Set the threshold for the blocking pressure alarm. A [blocking] alarm is issued when the device detects the blocking pressure exceeding the set threshold in the infusion.
menu item	**Windows default**	**Set the range**	**explain**

Bubble size	50ul	50, 100, 250 ,500 ,800 μl	Set a single bubble alarm threshold. When the device detects a single gas in the infusion and the bubble exceeds the set threshold, a [pipeline bubble] alarm will be issued.
Cumulative bubble	0. 1ml/ 15min	0.1ml/15min ~ 1.0ml/15min	Set the alarm threshold for the accumulated bubble. When the device detects a cumulative bubble in the infusion above the set threshold, a [cumulative bubble] alarm will be issued.
* The setting of this feature is particularly important if: Infusion for animal particularly sensitive to air bubbles (e. g., newborn and pediatric children) The infusion supplies used can produce a large number of small air bubbles			

KVO velocity of flow	1ml/h	seeA. 5 infusionControl and measurement rulesrattle	Open the KVO switch and enter the KVO automatically after the incoming infusion is completed.
Close to completion time	6 min	Guan, 1,2,3, and 4,5,6,7,8, 9,10,15,20, 25 , 30 min	Set how long before the distance from the end of the infusion to trigger the [near completion] alarm. When set to [off], the [near completion] alarm is not triggered.
drop number	And 10 drops / ml	From 10 to 60 drops / ml	Set the number of drops of 1ml of liquid from the pot.
No operation time	2min	Off,1,2,3,4, and 5 min	Set how long after the device has no operation will trigger the [no operation] alarm. When set to [off], the [no operation] alarm is not triggered.

menu item	**Windows default**	**Set the range**	**explain**

Non-infusion lock screen time	3min	off, 1, 2, 3,4, and 5 min	During the non-infusion period, the touch screen will automatically lock the screen after how long after no operation. When set to [off], the screen will not be automatically locked during non-infusion periods.
Infusion lock screen time	1min	off, 1min, 2min, 3min, 4min, and 5min	During the infusion period, the touch screen will automatically lock it for how long after no operation. When set to [off], the screen will not automatically lock during the infusion.

Quick push flow rate	(Maximum flow rate or 1200 supported by infusion set specifications) ml / h, take small	seeA. 5 Infusion infusionControl and measurement rulesrattle	Set the flow rate during a fast push.
Peak Flow Rate	2300ml/h	Set the same flow rate range, specifically see A. 5 Infusion control And measurement specifications	Set the maximum limit of the flow rate. If the set infusion flow rate exceeds the limit, the device indicates that the flow rate needs to be reset.
maximum VTBI	10000ml	See the same setting rangeA. 5 For infusion controlManufacture and measurement specifications	Set the maximum pending inflow limit. If the set amount exceeds the limit, the device prompts to reset the amount.
Dose speed unit	weight	Body weight (Kg), body weight (Lb), and body surface area	Set the unit of dose speed in body weight mode and TIVA mode. Set to [body weight (Kg)] fan Enclosure include X / kg/min, X / kg / h and X / kg / 24h, where X indicates ng, ug, mg, g, mU, U, kU, EU, mmol, mol, mcal, cal, kcal, and mEq

			[Weight (Lb)] Fan Enclosure include X / kg/min, X / kg / h and X / kg / 24h, where X indicates ng, ug, mg, g, mU, U, kU, EU, mmol, mol, mcal, cal, kcal, and mEq When set to [body surface area], you can The selected range includes X / $m^{2/min,X/m2/}$ h and X / m^2 / 24h, where X indicates ng, ug, mg, g, g, mU, U, kU, EU, mmol, mol, and mEq

menu item	Windows default	Set the range	explain
Commonly used dose units	Each dose unit	ng, ug, mg,g, mU, U, kU, EU, mmol,mol, mcal, cal, kcal, mEq	Check or uncheck the dose units.
Commonly used mode	Speed mode, A drip mode, Body weight mode, dose time mode, TIVA mode, time mode, sequence mode, interrupted dose mode, first dose mode, gradient mode, trace mode	Each infusion mode	Check or uncheck the infusion mode. The checked infusion mode can be displayed in the infusion mode list box in the Infusion Status display area. **Note: The selected Infusion Mode shall not be unchecked.**

Pay attention to

- **When switching the patient type, confirm that the settings apply for the new patient.**

7.3 Department management

menu item	Windows default	explain
Application department	/	Displays all departments included in the current drug library. The selected departments can be displayed in the title bar of the drug selection interface, and the drugs in the drug selection interface are switched to the drugs in the corresponding departments. Different departments can be configured with different drug libraries.
configuration management	/	Change the parameter settings of the applied department. After the parameters of configuration management are changed, the infusion setting of the corresponding department and the menu items of the system setting will also be changed synchronously.

7.4 System Settings

menu item	Windows default	explain
The alarm volume	2	Set the volume of the alarm sound. Setting range: 1~ 4.
luminance	2	Set the brightness of the screen display when powered by an external power source. Setting range: 1~8.
Battery brightness	2	Set the brightness of the screen display when battery powered. Setting range: 1~8.
history	/	View the history.
Export history	/	Exports the history record.

Night mode	Night mode	close	Set up the night-time mode switch. [Open]: Start the night mode when the system time reaches the set night mode start time. [Off]: Do not start the night mode function.
	start time	18:00	Set the start and end time of the night mode.
	terminal time	7:00	
	The alarm volume	4	Set the system volume and screen brightness after the device enters the night mode.
	System brightness	2	
The bed number		/	Show the animal bed number.
Version information		/	Check the product model, software version, system software, driver version, compilation time

take care

- **Before entering the night mode, confirm the settings of the system volume and screen brightness. Be alert if the setting value is small**

Potential risks

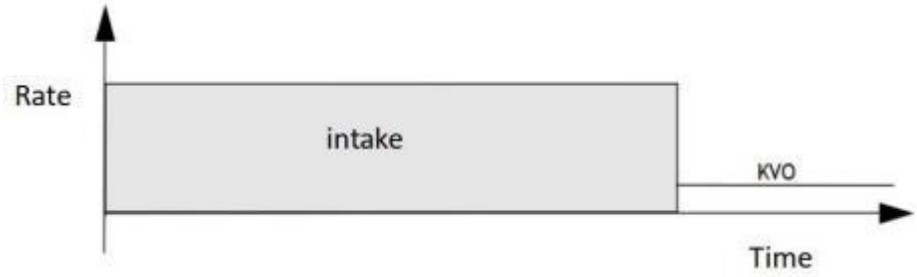
Chapter 8: Understanding the Infusion Patterns

This device supports the following infusion modes:

- Speed mode
- Weight pattern
- The first dose pattern
- Trace mode
- Time mode
- sequence pattern
- Intermittent administration mode
- Dose time pattern
- Gradient mode
- TIVA pattern
- A bit of mode

8.1 Speed mode / time mode

Both speed mode and time mode are applicable to the continuous drug infusion at a certain flow rate (ml / h). In speed mode or time mode, the flow rate, inflow amount and remaining time can be set. After setting two of the parameters, the device can automatically calculate the third parameter.



Pay attention to

- **The above schematic diagram can also be used for the drip mode, body weight mode, trace mode and dose time mode.**
- **In speed mode or time mode, the flow speed must be set before starting the infusion, and the inflow and remaining time can be used as needed To select settings.**

8.2 Body weight pattern

In weight mode, you can directly enter the dosage, volume, or concentration of the order. Clinically applicable to pediatrics, need to assess the amount of drugs according to body weight.

After completing the setting of body weight, concentration, dose speed and inflow, completing the setting of the flow rate, body weight, concentration and inflow, the device can automatically calculate the dose speed and the time left. The conversion formula is given as follows:

- Flow rate = (Dose speed * body weight) / concentration

- Dose velocity = (flow rate * concentration) / body weight
- Remaining time = standby inflow / flow rate
- Concentration = drug volume / fluid volume

[Drug volume], [liquid volume] or [drug concentration] can be configured according to the needs. Weight units can be set up as required. See for details Chapter 12 User Maintenance Settings.

Units changing dosage, dose speed, and drug concentration: Before infusion or during infusion suspension, the selected units at dosage, dose speed, and drug concentration will pop the corresponding list of units, and then re-select units as needed.

Pay attention to

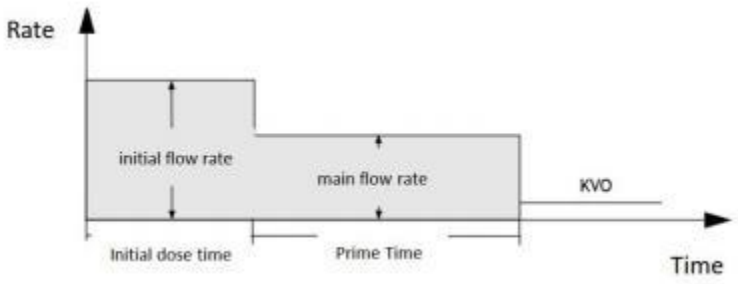
- **The remaining time can only be computed and input is not supported.**
- **Dose velocity in body weight mode was in X / kg/min, X / kg / h and X / kg / 24h optional, where X indicated ng, ug, mg, g, mU, U, kU, EU, mmol, mol, mcal, cal, kcal, mEq.**
- **For departments using a fixed dosage, dose, or drug concentration (e. g., neonatology), if drug letters are used**

Predefined body weight mode parameters will simplify the operation of the infusion.

8.3 First-dose mode

The first dose mode divides the total infusion volume into two phases:

- Complete [first dose] at [first dose flow rate].
- Complete the remaining infusion volume (VTBI minus the first dose) at the [main flow rate].



Pay attention to

- **If the first dose parameter is not entered, the device fluids at the set main flow rate until the inflow is completed.**

8.4 The trace mode

The ace mode is mainly used clinically for small flow infusion of children and newborns.

In trace mode, the flow rate, inflow amount and remaining time can be set, and two parameters are input, and the device can automatically calculate the third parameter.

The flow rate and inflow setting range of the trace mode are as follows:

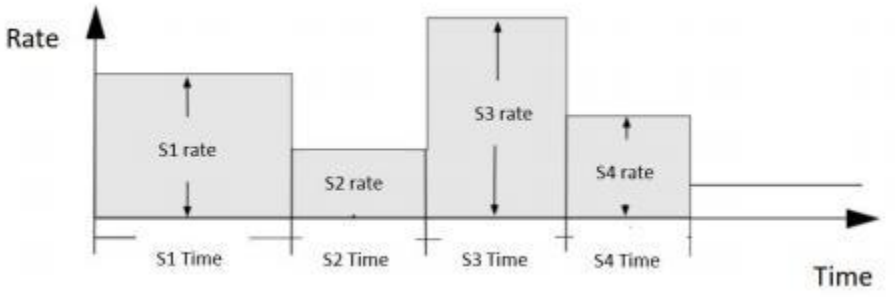
parameter	Set the range
velocity of flow	0.1~100ml/h
To be in quantity	0.1~ 1000 0 ml

Pay attention to

- **In the trace mode, the flow rate must be set before starting the infusion, and the waiting amount and the remaining time can be selected according to the needs place.**

8.5 The sequence pattern

In sequence mode, each sequence defines the infusion parameters (flow rate, inflow amount and time) within one infusion cycle, and the device is infusion according to the set sequence.



In sequence mode, after setting of the two parameters of flow rate, inflow and time, the device can automatically calculate the third parameter.

8.5.1 Add / delete sequences

The sequence pattern can be set for up to 10 sequences. To add or remove a sequence, you can follow the following steps:

1. In the parameter settings interface, select a sequence name (like S1).
2. In the pop dialog, select the desired action:
   - Select [add a sequence before] to add a sequence prior to the current sequence.
   - Select [Add a sequence later] Add a sequence after the current sequence.
   - Select [Delete] to delete the current sequence.

8.5.2 Change the infusion parameters

The flow rate of the current sequence can be changed during the infusion run. If you need to change the time and amount of the current sequence, select the key to pause the infusion, and then select the desired parameter region to change as needed 

If you need to change the parameters for the other sequences, follow the following steps:

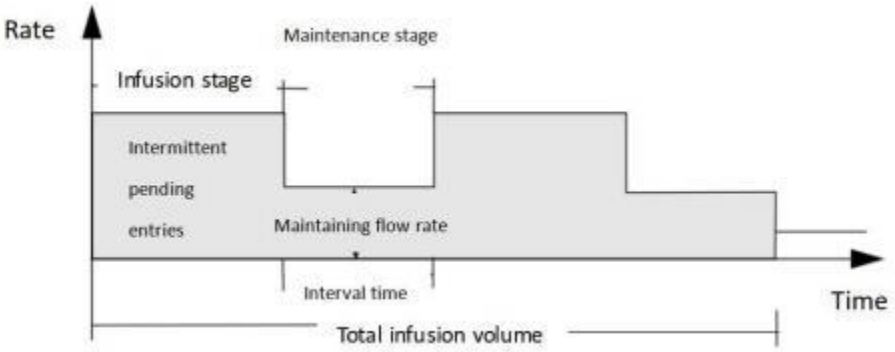
1. Select the key to pause the infusion 
2. selection key 
3. Select the desired parameter region as needed.

8.6 Intercontinuous administration mode

In the intermittent administration mode, the infusion phase and maintenance phases can be automatically circulated until the infusion is completed. The intermittent administration mode is suitable for the infusion of long-acting analgesic drugs.

- Infusion stage: complete the large flow rate infusion with the set [flow rate] and [intermittent inflow amount], since Move into the maintenance stage.
- Maintenance phase: complete the small flow rate infusion with the set [interval time] and [maintenance flow rate].tie up

When the holding flow rate is not set, there is no infusion during the maintenance stage.



Pay attention to

- **Total infusion volume and maintained flow rate are optional settings.**

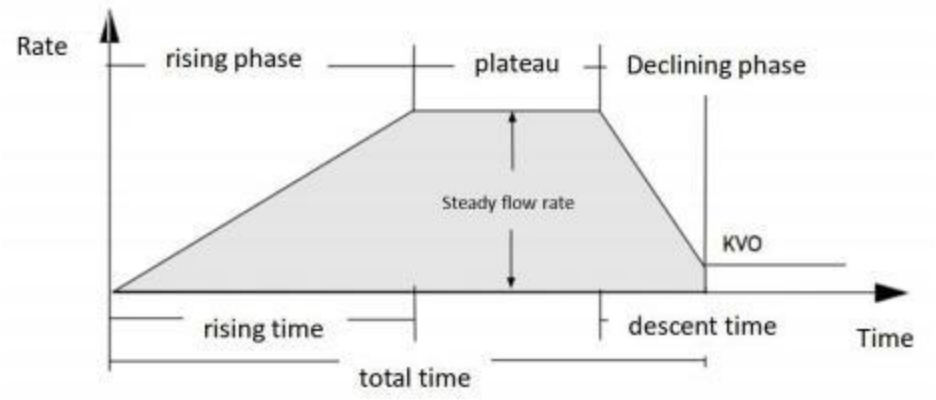
When the maintenance flow rate is not set, the maintenance phase is not an infusion transfusion

When the total amount is not set, the infusion is stopped after the infusion set is emptied.

8.7 Gradient pattern

The gradient mode is administered during the rising or decreasing flow rate, including the following three stages:

- Rising stage: During the preset rise time, the infusion flow rate rises straight up until the preset steady flow is reached Speed, and then automatically into the stable phase.
- Stability phase: perform the infusion at a steady flow rate.
- Drop stage: After the stability stage, the infusion is completed, during the set drop time, the infusion flow rate is set down in a straight line drop until the preset infusion volume is completed.



Pay attention to

- **The stable flow rate can only be obtained by calculation and cannot be input.**

The rise time and down time are optional settings. When not set, the pump is infusion at a steady flow rate

8.8 Dose time pattern

In dose time mode, you can directly enter the dosage, volume, or concentration in the order.

After completing the setting of concentration, dose speed and inflow, the device can automatically calculate the flow rate and remaining time. After completing the setting of flow rate, concentration and inflow, the device can automatically calculate the dose speed and remaining time. The calculation formula is as follows:

In dose time mode, you can directly enter the dosage, volume, or concentration in the order.

After completing the setting of concentration, dose speed and inflow, the device can automatically calculate the flow rate and remaining time. After completing the setting of flow rate, concentration and inflow, the device can automatically calculate the dose speed and remaining time. The calculation

formula is as follows:

- Flow rate = dose velocity / concentration
- Dose velocity = flow rate * concentration
- Remaining time = standby inflow / flow rate
- Concentration = drug volume / fluid volume

[Drug volume], [liquid volume] or [concentration] can be configured according to the needs. See for detailsChapter 12. User maintenanceset up.

Units changing dosage, dose speed, and drug concentration: Before infusion or during infusion suspension, the selected units at dosage, dose speed, and drug concentration will pop the corresponding list of units, and then re-select units as needed.

Pay attention to

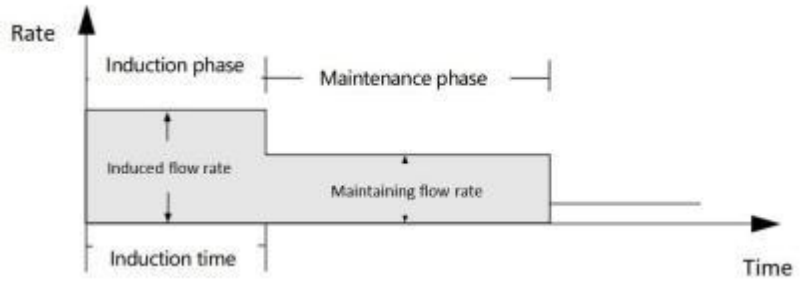
- **Dose velocity in dose time mode is optional in X / min, X / h and X / 24h, where X indicates ng, ug, mg, g, mU, U, kU, EU, mmol, mol, mcal, cal, kcal, mEq.**
  The remaining time can only be computed and input is not supported.

8.9TIVA pattern

Total intravenous anesthesia (TIVA) mode is used clinically to control intravenous infusion by setting induction and maintenance parameters. First, the induction volume will be completed at the set induction time, so that the patient can quickly enter the anesthesia state, and then push the injection to maintain the flow rate to maintain the depth of anesthesia. It is mainly used clinically for the infusion of anesthetic drugs.

The infusion in the TIVA mode can be divided into two stages:

- Induction phase: The pump completes the induction dose according to the set induction time.
- Maintenance phase: the pump at maintenance flow rate



Induced and maintained flow rates can only be obtained computationally and not supported. The calculation formula is:

- Induced flow rate = body weight * induced dose / (concentration * induction time)
- Maintain flow rate = body weight * Maintain dose velocity / concentration

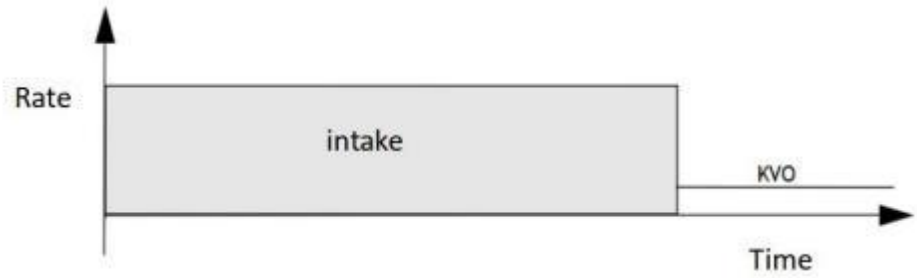
Change the units of induction dose, dosage, drug concentration, and maintenance dose speed: Before or during the infusion, select the list of units for induction dose, dosage, and suspension of infusion, and then re-select the units as needed.

8.10, the drip mode

The drip mode is suitable for continuous drug infusion at a certain flow rate (drop / min). In drip mode, the drop speed, amount and time can be set. After setting two of the parameters, the device can automatically calculate the third parameter.

The drop speed is set from (1-400) drops / min.

The upper limit of drop speed is related to the specification of the pot, and the calculation meets (400ml / h * (drop number / ml)) / 60min / h, where the number of drops / ml is the specification of the pot itself.



Pay attention to

- **In drip mode, the flow rate must be set before starting infusion, and the amount and remaining time can be selected according to needs place.**

Chapter 9 Drug Database

The equipment can be configured with drug database or drug information database according to the needs of drugs in different departments. The use of drug database or drug information database can simplify the operation process of infusion and reduce the risk of operation error. The drug library and the respective PC management software and imported into the device. Drug libraries and drug information databases have the following common functions:

- At least 5,000 drug names can be stored.
- Drugs can be identified in 10 colors.
- Support for at least 10 drug classifications.
- Support setting the drug and the drug concentration, blocking pressure, KVO flow rate,

  Fast push limit.

take care

- **The drug library and drug database must be created by professionals, and the drug settings should be applicable to the facility before use In the department**

Chapter 10: Patient Management

The patient-management menu displays patient-related information.

The steps to enter the [Patient Management] menu are as follows:

Run your finger down from the top of the screen to select [Menu] Select [Patient Management].

menu item	Windows default	Set the range	explain
room number	/	/	Display of the current patient room number.
The bed number	/		Show the current patient bed number
Medical record number	/		Displays the current patient medical record number
Registration number	/		Dis p lay the cur rent patient registration number
surname	/		Dis p lays the cur rent animal last name
Name	/		Dis p lay of the cu r rent patient name
stature	/		Dis p lays the current patient height
weight	/		Cu r rent patient body weight is dis played
BMI	/		Dis p lays the current animal BMI

date of birth	/		Current patient date of bi rt h is dis played
Type of patient	/		Dis p lay of the current patient type
sex	/		Dis p lays the cur rent patient gender

10.1 By relieving the patient

Old animal should be relieved before receiving new animal. After patient relief, all patient data, including patient information, were cleared. After removing the patient, the device automatically receives a new patient.

Remove the patient by using the following method:

1. Run your finger down from the top of the screen to select [Menu] Select [Release Patient].
2. In the outgoing dialog box, select [Accept].

The system automatically removes the patient in the following:

- After successful transfer of the patient data, the pump automatically removes the patient.
- After the patient is relieved by the central monitoring system or monitor, the pump automatically removes the patient.

Attention

- **The old patient should always be removed before administering the new patient, otherwise the data of the next patient will be stored to the current animal data.**

10.2 Edit the patient information

When the patient is received, the patient information is incomplete or needs to be changed, you can edit the patient information in the following steps:

1. Step down from the top of the screen to select [menu] to select [Patient Management] and enter [disease

Person Management] menu.

2. Edit the patient information as needed.

10.3 Application of code scanning gun

1. Click to swipe down from the top of the screen to select [Menu] Select [Patient Management]

2. Connect the code scanning gun to the USBA to C adapter and insert the type-c interface on the back of VP50

3, VP50 issued a "drop drop" sound indicating that the connection is successful

4. Scan the scanning gun at the bar code, give a "drop", [registration number], and read the content normally

Pay attention to

- **The scanning gun only works after the [patient Management] interface is opened**
- **The parameters of the scanning gun are displayed in [registration number]**

Chapter 11 Interconnected Communications

This equipment can be connected to the sDS 10 series infusion information acquisition system produced by our company for interconnection and communication.

11.1 Interconnected communication security information

Attention

- **The design, installation, commissioning and maintenance of the network layout must be implemented by the authorized maintenance personnel of the Company.**
- **The network network must follow the local laws.**
- **In order to ensure the network security and network stability, the data communication of all network-related functions must be used in the hospital center**
  With the closed network of. Hospitals should ensure the security of this private network.
- **Ensure the security of network encryption information, such as password, and do not allow unauthorized personnel to obtain encrypted information.**
- **Do not connect to non-medical devices in the network.**
- **When the network signal is blocked, the central monitoring system may present the risk of data loss.**
- **Disconnecting the network may cause data loss and functional failure of the central monitoring system. Once the network is found, please check the disease people, and solve the problem of breaking the network.**
- **Make sure that the device IP address is set correctly. Changing the network settings may cause network disconnection. If you have the IP settings of the question, please contact the maintenance personnel.**

Chapter 12 User Maintenance Settings

This chapter lists the default settings and function descriptions for each menu item of the [User Maintenance] menu.

take care

- **User maintenance settings are password protected and changing user maintenance settings must be done by authorized personnel if you need to obtain password access to these features, contact someone concerned.**

12.1 Enter the user maintenance menu

The steps to enter the [User Maintenance] menu are as follows:

1. swipe down from the top of the screen with your finger to select [menu] select [user maintenance], and enter the maintenance password selection [confirm].

2. Select the button to need to set.

12.2 Equipment management

menu item	default setting	explain
hospital	/	Enter the name of the hospital, department, and current equipment.
administrative or technical offices		
device name		
equipment number	/	Displays the number of the current device.
Asset number	/	Set the asset number for the current device.

12.3, and the system calibration

menu item	default setting	explain
Accuracy calibration	/	consult13.2, Maintenance planContact the maintenance personnel of our company.
pressure calibration	/	consult13.2, Maintenance Plan Contact the maintenance personnel of our company.
Calibration data viewing	/	View the calibration data.
Test data view	/	View the test data.

12.4 Brand management

menu item	default setting	explain
Brand selection	/	Check or uncheck the brand, the checked brand can be displayed in the brand list box.
Add brand	/	Enter the brand name, select the type of consumables ([ordinary], [precision], [avoid light], [blood transfusion] or [nutrition]), and then select [confirm], select whether to close the bubble, and complete the brand addition. After the brand is added successfully, it can be used as a common brand selection item on the [Brand Selection] page.

Delete the brand	/	Select an unnecessary brand, and then select [OK] to remove the brand. **Note: Only non-built-in brands can be removed.**
Brand information	/	Click on the corresponding brand to display the details of the brand

12.5 Time setting

menu item	Default setting	explain
date	current date	Set the current date.
time	0:00:00	Set the current time period.
date format	Year-month-day	Set the date format.

12.6, and the language settings

menu item	default setting	explain
SL	/	Set the language. **Note: The language setting does not take effect until the device is restarted.**

12.7 Clear history

menu item	default setting	explain
Clear history	/	Clear the history record

12.8 Parameter switch setting

menu item	default setting	explain
KVO switch	close	When the switch is turned on, the KVO infusion mode enters after the infusion is completed
Post evacuation KVO	close	When the switch is on, KVO infusion mode
Bubble detection	close	When the switch is on, the pipeline will bubble detected

12.9 Unit setting

menu item	default setting	explain
pressure unit	mmHg	Set the pressure unit. Options include: mmHg, kPa, bar, psi.
Body weight unit	kg	Set up the body weight units. Options include: kg, lb, m^2

12.10 Fast push limit setting

menu item	default setting	explain
hand movement	20 ml	Set the upper limit of the amount of fast push for manual fast push. When the set upper limit is reached, the device automatically stops the manual fast push.

voluntarily	50ml	Set the upper limit of the fast push amount for the automatic fast push. If the set fast push infusion volume exceeds the limit, the device indicates that the fast push volume should be reset.

12.11 Volume limit setting

menu item	default setting	explain
Exhaust limit	5 ml	Set the upper limit of the exhaust capacity when venting. When the set upper limit is reached, the equipment automatically stops the exhaust gas.

12.12 Tube assembly tips

menu item	default setting	explain
Installation guide	open	If the infusion set is not installed, enter the installation guide interface.

12.13 Restore the factory Settings

menu item	Default setting	explain
factory data reset	/	All the data is restored to the factory default data.

Chapter 13: Maintenance

Regular maintenance of the equipment and accessories is the key to ensure the normal operation of the equipment. This chapter describes the inspection and testing methods of the equipment.

13.1 Maintain safety information

Warning

- **In order to prevent electric shock caused by leakage current, please stop using the damaged shell of the equipment. Please contact the maintainer member processing.**
- **The hospital or medical institution using the equipment shall establish a complete maintenance plan, otherwise the equipment may fail And unexpected consequences, and may endanger personal safety.**
- **Do not make changes to this equipment by yourself.**
- **This equipment does not include user-serviceable parts. If you need any maintenance, please contact the maintenance personnel.**
- **All safety inspection or maintenance work requiring disassembled equipment shall be conducted by professional maintenance personnel, non-professional personnel The operation of the personnel may cause equipment failure and may endanger personal safety.**
- **The product maintenance personnel must be qualified and familiar with the product operation.**

take care

- **The equipment and the accessories shall not be maintained and maintained for animal.**
- **If there is any problem with the equipment (such as product labeling falling off), please contact the maintenance personnel.**

Pay attention to

- **For calibration, please contact our maintenance personnel.**
- **If necessary, please contact us for the product circuit diagram, component list, calibration instructions or other equipment repair phases**

close the information.

13.2, Maintenance Plan

Ensure that maintenance tasks are performed in accordance with the maintenance plan or local regulations. The equipment must be cleaned and disinfected before testing or maintenance.

Test and maintenance items and recommended frequencies are as follows:

<table>
<tr><th colspan="2">Check / maintain the items</th><th>Recommended frequency</th></tr>
<tr><td colspan="3">performance testing</td></tr>
<tr><td colspan="2">Select test items based on the requirements of the basic safety and performance standards of infusion pumps</td><td>• Every three years.
• When you suspect a blocking alarm exception.
• When the infusion flow is inaccurate.
• When the infusion set identifies the wrong.</td></tr>
<tr><td colspan="3">safety test</td></tr>
<tr><td colspan="2">Select the test items based on the requirements of the medical electrical equipment standards</td><td>• After the power module for repair or replacement.
• At least once every three years, or on demand.
• After replacing the main control panel or the equipment is dropped.</td></tr>
<tr><td colspan="3">Other tests</td></tr>
<tr><td colspan="2">visualization</td><td>Before the first daily use.</td></tr>
<tr><td colspan="2">Boot check</td><td>Every time the boot.</td></tr>
<tr><td rowspan="2">Battery inspection</td><td>function testing</td><td>• First time of the installation.
• After replacing the battery.</td></tr>
<tr><td>performance testing</td><td>Every three months or when the battery running time is significantly shorter.</td></tr>
</table>

Refer to the maintenance manual for pressure calibration, infusion set calibration, and sensor calibration	When the performance test fails.

13.3 Test methods and steps

All testing and maintenance, except the following maintenance tasks, can only be performed by professional maintenance personnel approved by the Company accomplish.

- Routine inspection, including visual inspection and boot detection
- Battery inspection

When other testing and maintenance is required, please contact the maintenance personnel timely.

13.3.1 Visual inspection

The appearance of the equipment needs to be checked before the first use every day. For damage or failure, please stop the use immediately and contact the equipment engineer of the hospital or the maintenance personnel of the company.

Visual inspection includes the following items:

- Environment and power supply meet the requirements.
- The equipment shell is not stained, and the panel and display screen are not broken and damaged.
- The power cord has no wear and good insulation performance.
- Interfaces, plugs, and cables are free from damage and winding.
- The cable is firmly connected to the equipment.

13.3.2 Boot-up check

Self-test will be performed after the device is started.

Under the startup check items:

- ■The device can turn on normally.
- ■The alarm system is working normally.
- ■Device display is normal.

13.3.3 Battery performance inspection

see13.4.4 Battery optimization Steps 1 to 5 in perform the battery check. The length of the battery supply time reflects the performance of the battery. If the supply time of the battery is significantly lower than the time claimed in the specification, the battery may have reached the service life, damage or failure, please contact the maintenance personnel.

If the battery is normal, recharge the battery or recharge it to 40 to 60% for storage.

13.4 Battery maintenance

The device is equipped with intelligent lithium-ion rechargeable battery to ensure that the device can be used normally when there is no external power supply. The device can switch between the external power supply and the battery power supply without interruption. When the external power supply is connected, the external power supply is preferred.

13.4.1 Battery safety information

Warning

●Use only the specified battery supply, and using a non-specified battery can lead to a fire or explosion.

● Do not squeeze, fall, or puncture the battery. Mechanical abuse may cause damage or short circuit inside the battery. If the electricity the pool has fallen or touched a hard surface and should be stopped regardless of whether the damage can be seen from the outside.

● If the battery is damaged or leaks, replace it immediately.

● The extremely high ambient temperature may cause the battery overheating protection, resulting in the power supply interruption of the equipment.

● Lithium battery has a service life, please replace the battery after the life expires, otherwise it may be due to the battery in the use process heat causes serious damage to the equipment.

●Do not dismantle the battery, place it in an environment above 60 C, burn it, or short-circuit it. This can be

Can cause battery combustion, explosion, leakage, or hot, causing personal injury.

take care

- **If the battery should be removed for a long time, otherwise the battery may be overdischarged, resulting in battery damage.**

Pay attention to

- **Storing batteries for long periods in high temperature environments can greatly shorten the expected service life of batteries.**
- **Storing batteries in cool environments can delay battery aging. Ideally, the batteries should be stored at the In the context of the 15 C.**

13.4.2 Install and replace the batteries

The battery of this equipment must be installed and replaced by the maintenance personnel trained and authorized by the Company. The equipment has been installed at the factory.

Replace and recycle the battery if not below:

- The battery is damaged or faulty.
- The battery ages, or the battery power time is significantly lower than the time claimed in the specification.
- When the battery life exceeds the service life.

take care

- **The installation and replacement of batteries by untrained personnel may cause hazards (e. g. overtemperature, fire or explosion).**

  When disposing of waste batteries, the corresponding laws and regulations should be followed.

13.4.3 Battery charging

To maintain good battery performance, fully discharging or near-fully discharging batteries must be charged as soon as possible. After connecting the AC power supply, the device can be charged automatically charged.

Pay attention to

- **Only this device can be used to charge the battery.**
- **When used with Software, the device can also be charged if Software is connected to an AC power supply.**
- **Before working with the built-in battery, check the battery to ensure that it has sufficient power. P. r. n,**

  Recharge the battery.

13.4.4 Battery optimization

The service life of the battery depends on the frequency and time of the battery use. If the use and storage is appropriate, the life of lithium battery is about three years. Battery life may be shortened. We recommend replacing the battery once every three years.

Battery performance decreases as the service time increases. It is recommended that you optimize the battery once every two months spend.

The battery optimization steps are as follows:

1. Disconnect the device from the patient.
2. Turn off the device and connect the external power supply.

3. Charge the battery continuously until it is fully charged.
4. Disconnect the external power supply and turn on the device. Use the battery to power the device until the battery is exhausted, and the device will automatically shut down.
5. If using the battery, recharge the battery, if stored, recharge it to 40 ~ 60% of the electric power rate.

Pay attention to

- **If the battery is not maintained for a long time, the battery power display may be inaccurate, leading to the battery working wrong judgment. In addition, if the battery is in full charge for a long time, without regular maintenance, it will accelerate the battery aging, lead to premature battery failure.**
- **Do not use this device for infusion during battery optimization.**
- **Do not interrupt charging or discharging during battery optimization.**

13.5 View the version information

You may need to view the version information of the device during maintenance. The steps to enter the [Version Information] menu are as follows:

1. Please swipe down from the top of the screen to select [menu]
Select [System Management].
2. Select [Version Information].

In the [Version Information] menu, you can view the product model, software version, system software, driver version, compilation time and other version information.

13.6 View the history

Some key operations will be saved as history during use. In the [History] menu, you can view infusion, alarm, calibration, maintenance settings and other operation information.

The steps to enter the [History] menu are as follows:

1. Please swipe down from the top of the screen to select [menu] Select [System Management].
2. Select [History].

Pay attention to

- **Device power failure has no effect on the storage history.**
- **This device can store the alarm records. The alarm record will be retained when the device is shut down. The shutdown time will also be recorded.**
- **VP50 can store 10000 history. If the storage space is full, the new history will overwrite more early record.**

13.7 Export the history record

History that you can export through the U disk. The method is as follows:

1. Insert the U disk into the USB interface of the device.
2. Click down from the top of the screen to select [menu] select [System Management].
3. Select [Export History].

13.8 Waste disposal

The service life of this product is 10 years. After the equipment reaches the service life, it shall be scrapped according to the local laws and regulations.

Warning

- **Disposal of components, batteries, packaging materials and accessories must comply with relevant local regulations or hospital waste Material treatment system**

Chapter 14: Maintenance and Cleaning

This chapter describes the cleaning and disinfection methods of the equipment host, clamp and stack supports. For other accessories, refer to their corresponding manual.

14.1 Maintenance and cleaning and safety information

Warning

- **Clean or disinfect the equipment or accessories using only the cleaners, disinfectants and methods listed in this section. To the company shall not provide any guarantee for any damage or accidents caused by the use of other materials or methods.**
- **Do not mix different disinfectants for use, otherwise it may cause harm.**
- **The Company assumes no responsibility for the effectiveness of the listed chemicals or methods as a means of controlling the infection.**

For ways to control the infection, consult the hospitals infection prevention department or epidemiologist.

- **Medical institutions are responsible for cleaning and disinfection according to the requirements of this chapter.**

take care

- **Before cleaning or disinfecting the equipment or accessories, you must turn off and unplug the power cord.**
- **Do not immerse the equipment or accessories in the liquid.**
- **When cleaning or disinfecting the equipment or accessories, avoid the metal parts and interfaces on the equipment or accessories to avoid corrosion.**
- **Do not dump the liquid on the equipment or accessories or let the liquid into the enclosure.**
- **If accidentally dumping liquid on the equipment or accessories, immediately disconnect the power supply, wipe the liquid and contact maintenance personnel or the company.**
- **No worn materials (such as steel velvet or silver polish), and any strong solvents (such as acetone or cleaner containing acetone ingredients) for cleaning.**
- **Please dilute and use the cleaning and disinfectant agent following the manufacturers instructions.**
- **After cleaning and disinfection, please carefully check the equipment and accessories. If any aging or damaged trace is found image, please stop using it immediately.**

14.2 Cleaning

The equipment host shall be cleaned regularly. In the areas with serious environmental pollution or large wind and sand, the frequency of cleaning should be increased. Please consult or understand the hospital about the cleaning regulations before cleaning. The cleaning steps are as follows:

1. Use a soft cloth, dip in water or 70% ethanol and squeeze dry.
2. Wipe down the display screen.
3. Wipe the surface of the equipment or accessories, and avoid the interfaces and metal parts.
4. Wipe off the surface of the equipment or accessories with a dry cloth and dry it in a ventilated, cool environment.

take care

- **Interfaces and metal parts may be corroded after contact with the detergent.**

14.3 Clean the fastening clips and stack supports

Fastening clamp and folding machine supports need to be cleaned regularly. Please refer to the regulations of your hospital for the specific cleaning frequency. The cleaning steps are as follows:

1. Wipe the fastening clamp or stack holder with a soft cloth dipped in water or 70% ethanol.
2. Dry the remaining detergent with a dry soft cloth.
3. Place the tight clamp or stack holder to dry in a ventilated environment.

take care

- **To avoid damage to the caused by improper disinfection, please treat the attachments according to the system of your hospital to disinfect.**

14.4 Sterilization

The sterilization treatment of this equipment, related products or accessories is not permitted, unless otherwise specified in the attached instructions.

14.5 The consequences of improper cleaning

A non-recommended cleaning method may have the following consequences:

- The surface of the equipment is discolored
- Metal parts are corroded
- Cracking and deformation of cables, interface and equipment housing
- The life of cable and lead wire is shortened
- system degradation
- equipment failure

Chapter 15: Annex

All the accessories listed in this chapter meet the requirements of the electromagnetic compatibility industry standard for medical electrical equipment when used with this equipment. For details of the attachment, see the relevant attachment instructions.

Warning

- **Using only the accessories specified by the Company, using other accessories may damage the equipment, or may not reach this Description the specifications as claimed in the book.**
- **The accessories listed in this chapter must be used in conjunction with the equipment, and the user is responsible to read the equipment before use (including with accessories) or contact the company for consultation to confirm the matching between accessories and equipment.otherwise, Will have the potential to cause patient harm.**

take care

- **If the accessory use or storage environment exceeds the specified temperature or humidity range, the accessory performance may not be accessible**
  To the claimed specifications. If the attachment performance decreases due to aging or environmental conditions, please contact the customer service staff.
- **Check whether the accessories and their packaging are in good condition, please do not use them.**
- **Check the compatibility of the equipment, connecting cable and accessories before use. Incompatible accessories will reduce the performance of the equipment or damage.**
- **Do not use attachments if expired.**

Pay attention to

- **See the attachment package for the sterilization attachment.**
- **For accessories with safe service life, see the accessories package for service life.**

order number	Attachment name	model	remarks
1	power line	LZD-103	10A 250V ~
2	Charging folding machine bracket	sDS10B	
3	Quick lock tight clip	317161016	

For any questions and feedback in your use, please contact our after-sales department:

A size of product

A.1 Safety specification

A.1.1 Product classification

This equipment is classified according to the medical electrical equipment standards as follows:

Type of shock protection	Class I, internal power supply equipment
Electric shock protection grade	CF application (anti-defibrillation, directly to the heart)
Prevent liquid entry grade	IP33
Mobile level	Can carry type
running mode	continuous duty

Pay attention to

- **This equipment is not a flammable anesthetic gas mixed with air or mixed with oxygen or nitrous oxide Equipment used in case.**
- **This equipment is portable, non-portable, and cannot be carried around by animal.**

A.1.2 Environmental specifications

project	Temperature (° C)	Relative humidity (non-condensing)	Atmospheric pressure (kPa)
work	5 ~ 40	15% ~95%	57.0~ 107.4
Storage and transportation	–30 ~ 70	10% ~95%	16.0~ 107.4

Description of storage conditions: no corrosive gas and good ventilation

take care

- **The equipment must be used under the specified environmental specification without meeting the technical specifications claimed in this specification case, and may lead to equipment damage and other unexpected consequences. If the sex of the equipment is due to aging or environmental conditions, please contact the maintenance personnel when it can change.**

A.2 Power supply specification

A.2.1 External power supply

project	input voltage	frequency	input current
AC input	100 ~ 240VAC	50/60Hz	0.5A ~ 0.21A

A.2.2 Battery

type	Lithium-ion rechargeable battery
Power on time	(@ 25ml / h flow rate, standard working conditions *) lithium battery shall not be less than 4 hours
Shutdown delay	(@ 25ml / h flow rate, standard working conditions *), since the low power alarm, can run for at least 30 minutes
*** Standard working conditions: new battery charged, ambient temperature 20℃ ± 2℃, screen brightness set to 1, default volume 1**	

A.3 Physical specifications

component	weight	Size （length/ width/height）
Main unit	1620g (net weight of host, including battery, excluding accessories)	Not greater than 210 x 149.5 x73 (mm)

A.4 Hardware specifications

A.4.1 Display

Screen type	screen size	resolution ratio
Capacitive screen	7 Inch	And 1,424 x 280 pixels

A.4.2 Host LED

Alarm lamp	Group 1 (red and yellow color)
External power supply indicator light	1 A (green)
Battery status indicator lamp	1 out (blue)
Infusion status indicator lamp	Group 1 (green)

A.4.3 Audio indication

loudspeaker	Send out the alarm sound (50dB-80 dB). support the multi-level volume function. The alarm sound meets the standard requirements of the alarm system for medical electrical equipment.

A.4.4 interface

Multi-function interface	One
USB joggle	One

A.5 Infusion control and measurement specifications

Infusion accuracy	Infusion error was ± 5% Fast push error ± 5% or ± 0.02 ml, take the large Dropping speed error is ± 10% pour: According to the national standard of GB9706.27-2005 The infusion accuracy uses the disposable pump infusion set infusion tube
Infusion speed set range	0.10 ml/h ~2300 ml/h **Infusion speed setting Step:** The minimum step of 0.10 to 1 ml/h was 0.01ml/h The minimum step of 1 ~ 2300ml/h was 0.1ml/h
Fast push speed set range	0.10 ml/h ~ 2300 ml/h **Fast push speed setting step:** The minimum step of 0.10 to 1 ml/h was 0.01ml/h The minimum step of 1 ~ 2300ml/h was 0.1ml/h
Blocking pressure	12 gear adjustable * for each unit, 300mmHg, 375mmHg, 450mmHg, 525mmHg, 600mmHg, 675mmHg, 750mmHg, 825mmHg, 900mmHg, 975mmHg, 1050mmHg, 1125mmHg 40kPa, 50kPa, 60kPa, 70kPa, 80kPa, 90kPa, 100kPa, 110kPa, 120kPa, 130kPa,140kPa,150kPa 0.4bar, 0.5 bar, 0.6 bar, 0.7 bar, 0.8 bar, 0.9 bar, 1 bar, 1.1 bar, 1.2 bar, 1.3 bar,1.4bar,1.5bar 5 .8 psi, 7.2 psi, 8 .7 psi, 1 0.1 psi, 1 1.6 psi, 1 3 psi, 1 4.5 psi, 1 5.9 psi, 1 7.4 psi, 1 8.8psi,20.3psi,21.7psi
Block alarm error	The alarm error of 300~1125mmHg ±20% or ±125mmHg (applicable at 0.1ml/h 2300ml/h).
Bubble detection	Single bubble gear 5 gear adjustable, respectively (50,100,250,500,800) μ l minimum detectable bubble volume of 50μl.

Single-fault infusion capacity	≤ 0.2ml
KVO velocity	0.1~ 1.0ml / h, with a minimum step of 0. 01ml / h 1.0 ~ 5.0ml / h with a minimum step of 0.1ml / h
Set the range of the infusion time	00:00:01~99:59:59 (h: min: sec), with the minimum step of 1s

Set the range of the incoming amount	0.1~ 1.0ml / h, with a minimum step of 0. 01ml / h 1~ 10000.0 ml with a minimum step of 0.1 ml
Body weight setting range	0.1 ~ 500.0kg/022 ~ 1102.31 lb
Set the range of drug volume	0. 1~ 10000
Setting range of drug dosage units	ng,μg,mg,g,mU,U,kU,EU,mmol,mol,mcal,cal,kcal, mEq
Liquid volume setting range	0.1~ 10000ml
Concentration set range	0.01~ 10000
Concentration unit setting range	ng/ml,μg/ml,mg/ml,g/ml,mU/ml,U/ml,kU/ml,EU/ml,mmol/ml, mol/ml, mcal/ml, cal/ml, kcal/ml, mEq/ml
Dose-speed setting range	0.01~ 10000

Warning

- **Infusion accuracy and blocking pressure detection are mainly affected by the viscosity of infusion liquid and disposable consumables (such as**

consumables

Pipe diameter, piston, material, needle size, etc.).

Pay attention to

- **The test of infusion accuracy and blocking pressure meets the requirements of the basic safety and performance standard of the infusion pump (tested ambient temperature is 20℃ ± 2℃).**

A.6 Recommended infusion sets

This equipment is built in a variety of common infusion sets, convenient for users to choose. Only infusion sets meeting pump standards can be used on this infusion pump. The following table lists the recommended infusion sets:

Name of infusion device	model	manufacturer
Single-use sterile infusion set	20 drops of distilled water are equivalent to ml±0.1ml	Shenzhen Security guard Medical Supplies Co., LTD
Single-use sterile infusion set	20 drops of distilled water are equivalent to ml±0.1ml	Shandong Xinhua Ande Medical Supplies Co., Ltd
Single-use sterile infusion set	20 drops of distilled water are equivalent to ml±0.1ml	Shanghai Conde Lai Enterprise Development Group Co., LTD
Single-use sterile blood transfusion device	20 drops of distilled water are equivalent to ml±0.1ml	Shandong Weigao Group Medical Polymer Products Co., Ltd
Disposable ultra-low-density polyethylene infusion set	20 drops of distilled water are equivalent to ml±0.1ml	Shandong Weigao Group Medical Polymer Products Co., Ltd

A.7 Block alarm delay and possible bolus dose reference table

Flow rate (ml/h)	Alarm delay (hh: mm: ss)	
	Maximum blocking gear	Minimum blocking gear
1	< 01:17:26	< 00:04:37
25	< 00:02:43	< 00:00:14

The above data test conditions:

- Infusion device brand: security infusion tube
- Test temperature: 20 ± 2℃
- Line length: 1 m

Flow rate (ml/h)	Obstruction bolus dose (ml)	
	Maximum blocking gear	Minimum blocking gear
25	< 0.18	< 0.18

The above data test conditions:

- Infusion device brand: security infusion tube

The ■ Anti-bolus function is turned on

- Test temperature: 20 ± 2℃
- Line length: 1 m

Pay attention to

- **Blocking alarm pressure, delay time, and blocking bolus dose were affected by test conditions, temperature, and line length.**

A.8 Infusion accuracy curve

A.8.1 Accuracy curve (1ml / h)

Horn curve (2nd hour) set flow rate: 1ml / h

Start curve (first 2 hours) set flow rate: 1ml / h

A.8.2 Accuracy curve (25ml / h)

Speaker curve (2nd hour) Set flow rate: 25ml / h

Start curve (first 2 hours) set flow rate: 25ml / h

A.8.3 Accuracy curve (20 drops / min)

Horn curve (2nd hour) set flow rate: 20 drops / min

Start curve (first 2 hours) Set flow rate: 20 drops / min

The above data are based on the following test conditions:

- Infusion set brand: security infusion tube
- Measurement interval: △ t =0.5 minutes

Pay attention to

- **Infusion accuracy may be affected by the use environment (e. g., pressure, temperature, humidity, brightness, delivery used liquid consumables, etc.).**

B EMC And radio management compliance

B.1 EMC

This equipment meets the relevant requirements of the electromagnetic compatibility industry standard for medical electrical equipment.

Warning

- **This equipment shall not be used near or stacked with other equipment. If it must be used close or stacked, it shall be observed verify that it works properly under the configuration that it uses.**
- **Class A equipment is intended to be used in the industrial environment in other environments due to conduction and radiation harassment of the equipment to ensure that EMC may be potentially difficult.**
- **Except for the transducers and cables sold by the manufacturer of this equipment as spare parts for internal components the accessories, transducers and cables may result in an increase in the launch of the equipment or decreased immunity.**
- **Even if other equipment meets the launch requirements of the corresponding national standards, the equipment or system may still be replaced by other equipment disturb.**

Pay attention to

- **The user shall install and use the product based on the EMC information provided in the random documents.**
- **Portable and mobile RF communication equipment may affect the performance of the equipment and avoid strong electromagnetic interference, such close to cell phones, microwave ovens, etc.**

If the equipment is intended to be used in the electromagnetic immunity guidelines and declared electromagnetic environment, the equipment shall remain safe and provide the following essential performance:

- accuracy
- Blocking pressure
- report to the police

Electromagnetic emission guidelines and statement		
The equipment shall be used in the specified electromagnetic environment, and the customer or user shall guarantee to use the equipment in the following specified electromagnetic environment.		
Launch test	**compliance**	**The Electromagnetic Environment-A Guide to the**
radio-frequency emission GB4824	Group 1	This device uses RF energy only for its internal functions. Therefore, its RF emission is very low and has little possibility of interference with nearby electronic devices.
radio-frequency emission GB4824	A class	This equipment is suitable for use in all facilities non-domestic and not directly connected to the public low-voltage supply network.
Harmonic emission GB 17625.1	not applicable	
Voltage fluctuations with the flicker GB17625.2	not applicable	

Electromagnetic immunity guidelines and statements
The equipment shall be used in the specified electromagnetic environment, and the customer or user shall guarantee to use the equipment in the following specified electromagnetic environment.

Perturbation test	IEC6060 1 Test level	In line with the level	The Electromagnetic Environment-A Guide to the device
Electrostatic discharge (ESD) GB/T 17626.2	± 8 kV contact discharge ± 15 kV air discharge	± 8 kV contact discharge ± 15 kV air discharge	The ground must be wooden, concrete, or ceramic tile. If the floor is covered with synthetic material, the relative humidity is at least 30%.
Electric rapid pulse group (EFT) GB/T 17626.4	The ± 2 kV power supply cord ± 1 kVI / O cable	The ±2kV power supply cord	A typical grid power quality must be commercial or hospital environment.
Surge GB/T 17626.5	± 1 kV difference mode ± 2 kV co-mode	± 1 kV difference mode ± 2kV	
Voltage drop, short time Interruption and voltage changes GB/T 17626.11	<5% UT (drop of> 95% UT) for 0.5 cycles 40% UT (a 60% drop UT) for 5 cycles 70% UT (down by 30% UT) for 25 cycles <5% UT (drop of> 95% UT) for 5 seconds	<5% UT (drop of> 95% UT) for 0.5 cycles 40% UT (a 60% drop UT) for 5 cycles 70% UT (down by 30%UT) for 25 cycles <5% UT (drop> 95% UT) for 5 seconds	The network power supply quality must be A typical commercial or Hospital environment. If this set, we nee to keep continuous Operation during the power supply off, we recommend using UPS UPS.

Power frequency magnetic field (50/60Hz) GB/T 17626.8	3A/m	3A/m, 50/60Hz	The power frequency magnetic field must be the level of a typical site in a typical commercial or hospital setting.
Note: UT is the AC net voltage before the test voltage is applied.			

Electromagnetic immunity guidelines and statements			
The equipment shall be used in the specified electromagnetic environment, and the customer or user shall guarantee to use the equipment in the following specified electromagnetic environment.			
Perturbation test	**IEC 60601 Test level**	**In line with the level**	**The Electromagnetic Environment-A Guide to the**
Conducting resistance to disturbance GB/T 17626.6	3 V (valid value) 150k ~ 80MHz (Except engineering medical band A)	3V (valid value)	Portable and mobile RF communication equipment must be off the equipment and or system (including electricity The specified distance for any part of the cable inside) Used from outside. This isolation distance is the root Select the appropriate equation according to the transmitter

	10V (valid value) 150k ~ 80MHz (Engineering and medical frequency band A)	10V (valid value)	frequency Calculated. The proposed isolation distance The calculation is: $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{p}$ $d = 1.2\sqrt{p}$ 80M ~ 800MHz $d = 2.3\sqrt{p}$ 800M ~ 2.5GHz Where, P is the rated maximum output of the transmitter Power, and is measured in Watt.d is the suggested distance From, in meters. RF frequency field by measuring c The field strength of the regime in each frequency range d The inside must be less than the compliance level. Near the device marking the following symbols may Disturbance: 
Radiation resistance GB/T 17626.3	10V/m 80M ~ 2.5GHz	10V/m	

Note 1: At 80 MHz ~ 800 MHz, use the higher frequency band formula.
Note 2: The above guide lines are not applicable to all situations because the material structure, object, and population can absorb and reflect electro magnetic waves that affect electro-magnetic propagation.

a. The 150k~80MHzISM (engineering doctor) frequency band refers to 6.765MHz~6.795MHz, 13.553MHz~13.567MHz, 26.957 MHz ~ 27.283MHz and 40.66MHz ~ 40.70 MHz.

b. The compliance level in the ISM (engineering doctor) 150 kHz ~ 80 MHz band and frequency range 80 MHz ~ 2.5 GHz is expected to reduce the possibility of interference when the mobile / portable communication device is accidentally brought into the patient area. For this attachment factor 10 / 3 is used in the recommended isolation distance calculation formula corresponding to these frequency ranges of the transmitter.

c. The field strength of radio (cellular and wireless) base stations and ground mobile radio receiving devices, antenna receiving devices, FM and FM radio broadcasts, and television broadcasting cannot be accurately estimated by using purely theoretical methods.
In order to assess the electromagnetic environment generated by a fixed RF transmitter, the method of electromagnetic field measurement should be considered. If measured
If the field strength of the equipment use environment exceeds the specified RF level, it is necessary to observe whether the equipment can work normally. Once an abnormality is found, measures must be taken, such as replacing the direction of the device or moving it to other environments.

The distance recommended to maintain between this device and the portable / mobile RF communication device

The device can be used in an electromagnetic environment where RF interference is controlled. To avoid electromagnetic interference, the customer or user shall maintain the minimum recommended distance between the device and the portable / mobile RF communication device. The following recommended distance is calculated based on the maximum output power of the communication equipment.

Rated maximum output power of the transmitter (W)	Isolation distance (m) is calculated based on the frequency of the transmitter			
	150k～ 80MHz (Except for the engineering and medical frequency band) $d \quad 1.2\sqrt{P}$	150k～ 80MHz (Engineering and medical frequency band) $d \quad 1.2\sqrt{P}$	80M～ 800MHz $d \quad 1.2\sqrt{P}$	800M～ 2.5GHz $d \quad 2.3\sqrt{P}$
0.01	0.12	0.12	0.12	0.23
0.1	0.38	0.38	0.38	0.73
1	1.2	1.2	1.2	2.3
10	3.8	3.8	3.8	7.3
100	12	12	12	23

If the rated maximum output power of the transmitter is not included in the value given above, the isolation distance can be estimated by using the equation in the corresponding column. P in the equation is the rated maximum output power given by the transmitter manufacturer in watt. Note 1: At 80 M ~ 800 MHz, adopt the formula of the higher frequency band.

Note 2: The frequency band of 150 k~ 80MHz I S M (engineering doctor) refers to 6.765 MHz ~ 6.795 MHz, 13.553M Hz ~ 13.567MHz, 26.957 MHz ~ 27.283MHz, and 40.66MHz ~ 40.70 MHz.

Note 3: Attachment factor 10 / 3 is used to calculate the isolation distance of the recommended transmitter in the ISM (engineering doctor) 150 kHz ~ 80 MHz

frequency band and frequency range 80MHz~2.5GHz to reduce the possibility of interference when the mobile / portable communication equipment is accidentally brought into the patient area.

Note 4 : The above guidelines are not applicable to all situations because the mate ria l structure , object , and population can absorb and reflect electro

magnetic waves that affect electro magnetic propagation .

C Abbreviations

abbreviation	English	Description
AC	Alternating Current	alternating current (AC
BOLUS	Bolus	Quick push
CCU(CICU)	Cardiac Intensive Care Unit	Cardiac (coronary heart disease) care unit
CE	Conformité Européenne	The European Community (French language)
CIS	Clinical Information System	clinical information system
CISPR	International Special Committee on Radio Interference	The International Special Commit on Radio Interference
CPU	Central Processing Unit	central processing unit
DC	Direct Current	direct current
DPS	Dynamic Pressure System	Dynamic pressure detection system
EEC	European Economic Community	European economic community
EMC	Electromagnetic Compatibility	electromagnetic compatibility
EMI	Electromagnetic Interference	electromagnetic interference
EtO	Ethylene oxide	epoxyethane
ICU	Intensive Care Unit	intensive care unit

ID	Identification	status
IEC	InternationalElectrotechnical Commission	The International Electrotechnical Commission
IEEE	Institute of Electricaland Electronic Engineers	The Association of Electronic and Electrical Engineers
abbreviation	**English**	**Description**
ISO	International Organization for Standardization	ISO
IV	Intravenous	I.V.T
KVO	Keep vein open	Keep the veins open
LED	Light Emitting Diode	LED
Max	Maximum	maximum
MDD	Medical Device Directive	medical device directive
Min	Minimum	minimum
MRI	Magnetic Resonance Imaging	NMR-imaging
N/A	Not Applied	not applicable
OR	Operating Room	operating room
PCA	Patient Controlled Analgesia	Patient self-control pain
SN	Series Number	serial number
TCI	Target Controlled Infusion	target controlled infusion
TIVA	Total Intra Venous Anesthesia	Total IV anesthesia
USB	Universal Serial Bus	universal serial bus
VTBI	Volume To Be Infused	To be in quantity

D Toxic and harmful substances or elements

Part name		lead Pb	Mercury Hg	cadmium Cd	hexavalent chromium Cr(VI)	Polybrominated biphenyl PBB	PBDE PBDE
main unit	Host shell	○	○	○	○	○	○
	key	○	○	○	○	○	○
	labeling	○	○	○	○	○	○
	Host hardware	○	○	○	○	○	○
	Internal connection	○	○	○	○	○	○
	PCBA	○	○	○	○	○	○
display screen	touch screen	○	○	○	○	○	○
pack	packing material	○	○	○	○	○	○
be in common use	adapting piece	○	○	○	○	○	○
	power line	○	○	○	○	○	○
cell	lithium cell	○	○	○	○	○	○
appendix	appendix	○	○	○	○	○	○
remarks	○: Indicates that the content of the toxic and harmful substance in all homogeneous materials of the component is in SJ/T11363-006 The prescribed limit are below. : Indicates that the content of the toxic and harmful substance in at least one homogeneous material of the component exceeds the limit requirements specified in SJ / T11363-2006.						