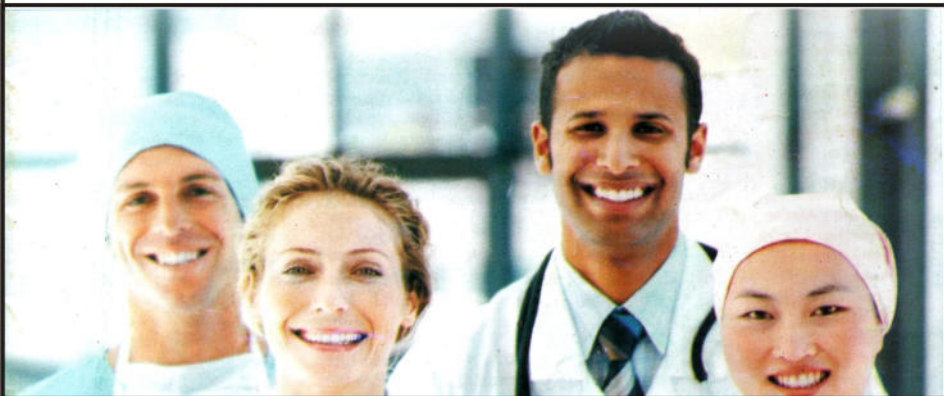


*Western Surgical*

# INFUSION PUMP SP750

USER MANUAL - 2020



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# Preface

## Important prompts

Before operating the pump, please read this manual carefully.

Please save this manual well for further use.

The User Manual is completely compiled in accordance with IEC60601-2-24:2012, IEC 60601-1:2012 and IEC 60601-1-8:2012. The information contained in this document is subject to change without prior notice.

Owing to the forthcoming renovation, the products you received may not be totally consistent with the description of this User Manual. We would sincerely regret for that.

## About This Manual

This manual mainly introduces the following contents:

- ◆ Overview, functional description and technical specifications.
- ◆ Installation and test methods.
- ◆ Operation procedures for the pump and main menu, calibration procedures for IV set.

## Safety Precautions

### Warnings:

- ◆ The pump can not be operated by the person who is not familiar with it.
- ◆ The pump must be properly grounded.
- ◆ The pump can only be used for general infusion, avoid using for infusing blood or other situations.
- ◆ During using the pump, please check the residual volume and IV set pipe, and don't completely depend on the alarm functions of the pump.
- ◆ Avoid using the pump in alarm state.
- ◆ Please replace the fuse with same specification.
- ◆ Do not use the disposable infusion components, or disinfect to them. after using, please dispose them following appropriate methods.
- ◆ Avoid using the pump in environment with flammable things.
- ◆ Operate the pump in the range of 120 cm of patient heart height.
- ◆ Only the components, connectors and disposable products complied with the National Standards can be used in the system. Please consult the dealer you purchased the pump about relevant information.
- ◆ If use the IV set which have not been tested, then the accuracy can not be ensured, and the maximum error may be up to above 40%.
- ◆ The pump is a system that provides positive pressure, it can produce positive liquid pressure to overcome these resistance occurred in actual process, including the resistance produced by small catheters and filters, which is convenient for infusing liquid for vein. As using filters during infusing is not considered, the pump doesn't provide the function of checking filter, and alarm doesn't appear under the condition of using the filters.
- ◆ USB is a special port for the technical personnel to connect equipment, to avoid damage to the pump, other persons should not connect the equipments not appointed. And the USB port can not be used for charging, otherwise it may cause damage.

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## Attention:

- ◆ Make sure that the pump is securely attached to the infusion pole to avoid risk for pump sliding.
- ◆ Before operating, please make sure the IV set pipeline is unblocked and installed properly.
- ◆ Make sure that there is no air bubble in the IV set, otherwise use "Purge" or manual mode to remove it.
- ◆ When the pump has been working for more than an hour continuously, in order to ensure high infusion accuracy, please replace the IV set pipeline to ensure the pipeline between peristaltic pump and board has not been extruded.
- ◆ Don't place the extruded tube among the ultrasound transducers when reinstalling the IV set pipeline, to avoid it mistakenly alarm for air bubble.
- ◆ If the IV set in use has not been tested, its accuracy will not be ensured.
- ◆ If use the IV set not tested, then the infusion accuracy can not be guaranteed.
- ◆ The pump is calibrated for the accuracy with distilled water, and solution consistency and proportion may influence the infusion accuracy.
- ◆ The pump is designed for stopping infusing under other alarm conditions, except for "NEAR END", "KVO", and "LOW BATTERY" alarms. Periodic monitoring must be performed to ensure that the pump works as expected.
- ◆ Before working with internal battery, check the battery to make sure it has sufficient power. When necessary, recharge it.
- ◆ Under the condition of full battery, the pump can continuously work for more than 4 hours with the speed of 25 ml/h, but the working time can not be guaranteed if the battery is broken or lack of power, please don't use rapid injection in low battery state.
- ◆ If "ALARM" occurs during infusing, please operate the pump following the User Manual and prompts, special warnings, such as "Communication failure", please check the infusion parameters.
- ◆ If the pump runs abnormally, and the reason is not clear, please stop infusing and report the error (including the information of the infusion components, infusion amount, infusion rate, machine No, the type of the infused liquid, etc.) to the distributor or manufacturer who sells the product to you in time.
- ◆ The power switch located on the back of the pump can not shut off the pump power (It only switches to internal battery). Press "ON/OFF" button on front panel for more than 1s to shut off the power.

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# Chapter 1 Overview

## 1.1 General

The product is a volumetric Infusion Pump. The Infusion Pump is designed to use in clinical therapy where accurately infusion and infusion process monitoring are required, such as internal medicine, surgery, pediatrics, obstetrics and gynecology, ICU, CCU, operating room and other clinical infusion.

This product is intended for medical institutions to accurately and continuously infuse liquid or liquid medicine (except for blood or nutrition infusion) into patients through their veins at a constant speed.

## 1.2 Special Safety Precautions

- ◆ IV set clamp prevents liquid flowing freely if the pump door opens accidentally.
- ◆ High-accurate air bubble detector prevents air bubbles from entering the patient's body.
- ◆ The pressure sensor can prevent the blocking of IV set.
- ◆ A.B.S system, When the high-voltage blocking alarm appears, please stop infusing immediately, and eliminate the pressure in the IV set automatically, to prevent the transient high-dose injection from the sudden obstruction disappearing.
- ◆ Infusion parameters during infusing are protected against being changed arbitrarily.

## 1.3 Features

- ◆ High-accurate fluid delivery, to achieve optimal infusion effect.
- ◆ Compatible with most standard IV sets.
- ◆ 3.5' LCD for displaying each parameter.
- ◆ Residual time can be displayed during infusing.
- ◆ Reminding function for starting infusion to avoid operation forgotten.
- ◆ Functions of occlusion alarm, such as alarm for air bubble, door open and motor failure.
- ◆ Air bubble and pressure alarm threshold can be adjusted by medical personnel.
- ◆ Accompanying IV set clamp prevents liquid flowing freely if the pump door opens accidentally.
- ◆ A.B.S—ANTI BOLUS system prevents the transient high-dose injection from the sudden obstruction disappearing.
- ◆ Stop infusing automatically during alarms. (except for "NEAR END", "KVO", and "LOW BATTERY" alarms)
- ◆ The alarm volume can be adjusted.
- ◆ Supply power with connecting external AC, DC and built-in lithium battery.
- ◆ Compact aluminum housing, stable configuration.
- ◆ USB port is convenient for technical personnel to update software.
- ◆ The versatile bracket enables mounting the pump on infusion pole in many directions, which can save the space.

The basic performance of the infusion pump is to carry out the auxiliary infusion according to the infusion parameters set by the medical personnel, and can accurately control the infusion speed, and sensitively detect the abnormal state in the process of infusion. This product is intended for patients who need intravenous infusion, and it is suitable for hospitals, communities, medical clinics and other places.

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## 1.4 Technical Specifications

Type	Volumetric infusion pump
Bolus rate	699 ml/h
Range of infusion rate	1 ml/h~699 ml/h
Preset volume range	1 ml~9999 ml
Accuracy	±5%
KVO rate	1 ml/h~5 ml/h
Display information	①Infusion rate ②Total volume ③Infused volume ④Residual time
Alarm	①Infusion reminding ②Door open ③Occlusion ④Air bubbles ⑤Motor failure ⑥Communication failure ⑦Near end ⑧Enter KVO ⑨Low power ⑩No power
Occlusion pressure check	100 kPa~300 kPa
Safety classification	Class I, type BF (This product has three kinds of power supply with class I, special power supply and internal power supply.)
Water proof	IPX1
Working mode	Continuous operation
Power supply	AC: 100 V~240 V, 50/60 Hz or DC:12 V
Fuse	F1.6AL250V
Battery	Rechargeable Li-Ion battery, 7.4 V/3500 mAh
Charging for battery	When the pump is connected to AC and the switch is in "ON" state, the battery can charge automatically, and it takes 8 h~12 h for fully charging.
Continuous operation	The pump can work for more than four hours with the injection rate of 25 ml/h after fully charged.
Maximum weight	3.5 kg
Dimension	197 mm*145 mm*135 mm (L×W×H)
Working environment	① Temperature: +5 °C~+40 °C;② Relative humidity ≤90%; ③ Atmospheric pressure: 860 hPa~1060 hPa
Storage environment	①Environment temperature:-20 °C~+55 °C ②Relative humidity ≤90% ③Atmospheric pressure: 700 hPa~1060 hPa
Applicable IV set	The disposable syringe of "jierui" brand manufactured by "Shandong Weigao Group Medical Polymer Company Limited".

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## 1.5 Panel Instruction

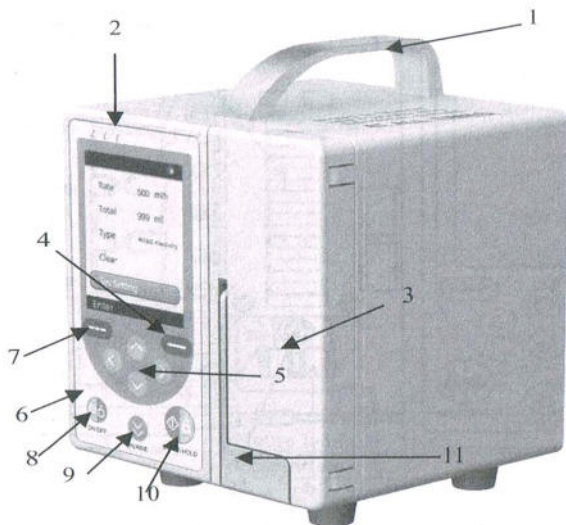


Figure 1-1 Front panel view

No.	Name	Description
1	Handle	Be convenient for carrying in transportation.
2	Working state indicator	It is green when the pump runs normally, and red when alarm appears.
3	Pump door	Fix the IV set.
4	Selection key	Perform the operation indicated by the characters on the bottom of the screen.
5	Cursor or number selection key	If need to input number, press "UP" or "DOWN" key to select. It is used for cursor selection key in other times.
6	Power and charging indicator	Indicate the power type: Yellow: when the pump works with battery only; Green: when the pump works with external power; Green (charging indicator): in charging state.
7	Enter/Alarm clear key	Confirm the contents indicated by the characters on the bottom of the screen.
8	Turn on/off the device (ON/OFF)	Continuously press it to turn on or off the pump (it is invalid in infusing process).
9	High-dose infusion (purge)	It is used for rinsing the IV set before infusing; This button is prohibited to use during infusing process; When the infusion is suspended, press it to infuse fleetly with the infusion rate of 699ml/h.
10	START/HOLD	In main menu, press it to start or halt infusing.
11	Lack for pump door	Open the pump door when put it up.

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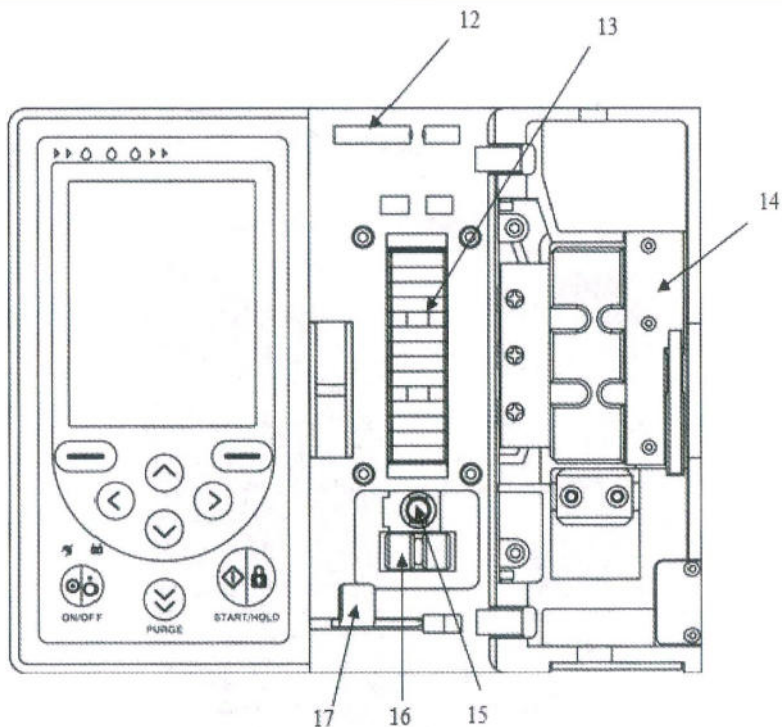


Figure 1-2 Internal view for pump door

NO.	Name	Description.
12	IV set slot	Fix the IV set.
13	Finger peristaltic pump	Extrude the IV set and control the flow rate.
14	Door sensor	Detect the pump door state (ON/OFF) during infusing.
15	Pressure sensor	Detect whether there is occlusion in tube.
16	Air bubble detector	Detect whether there is air bubble in the IV set during infusing.
17	IV set clamp	When the door is opened, the clamp will tighten the IV set immediately to prevent liquid flowing. When it is closed, the IV set clamp will open automatically, and the liquid can flow.

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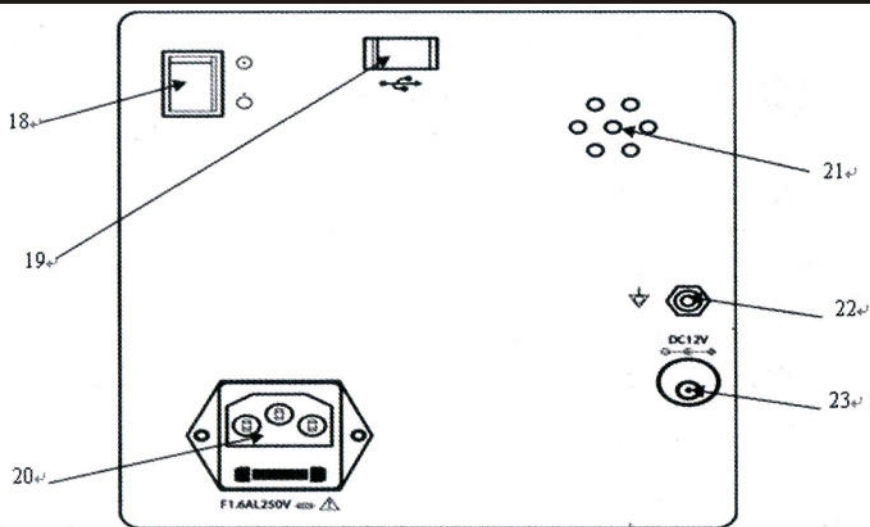


Figure 1-3 Back view

No.	Name	Description
18	Power switch	Press it to connect to AC ( <b>Attention:</b> the switch only controls the power state, can not control the pump state).
19	USB socket	Used for software upgrade and parameter calibration.
20	Power cord socket	Connect AC power cord, contained 1.6 A/250 V fuse.
21	Speaker	Audible alarms.
22	Equipotential terminals	Connected to class I equipment grounding protection components
23	DC input	Connect the DC (12 V)

## 1.6 Packing

### Standard Accessories:

- (1) One host
- (2) One Versatile bracket
- (3) One power cord
- (4) One user manual

### Attention:

- If any accessory in packing is missing, please contact the dealer immediately.
- Power cord length is 1.8 meters
- Prohibition of the use of power cord provided by other manufacturers

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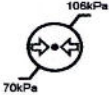
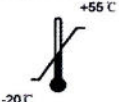
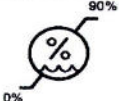


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# Label Marks and Signification:

Mark	Description
	Refer to instruction manual/booklet
	Type BF
<b>IPX1</b>	Ingress of liquids rank
	WEEE (2002/96/EC)
	Equipotentiality
<b>CE</b> 01 23	This item is compliant with Medical Device Directive 93/42/EEC of June 14, 1993, a directive of the European Economic Community.
	European Representative
	Package should be kept between 70 kPa~106 kPa during transport
	Package should be kept between -20 °C~+55 °C during transport
	Package should be kept between 0%~90% humidity during transport
	Keep upright during transport
	Fragile item, handle with care

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Protect from rain during transport



Similar packaging stacked up to 8 layers only



Manufacturer



Date of manufacture



Serial number



Infusion liquid flow



Disconnect



Connect



USB port



DC power connector polarity

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## Chapter 2 Installation

### 2.1 Site Requirements

The power cord should be connected to a power socket with three-pin (one pin is Earth wire), power supply is AC 100 V~240 V, 50/60 Hz. Don't place the pump in environment with inflammable liquid or gas. The pump should be operated within a temperature range of 5 °C to 40 °C. Do not operate the pump near equipment that emits high frequency electromagnetic radiation (such as high frequency surgical unit or cauterizing equipment), to avoid the false alarms.

**⚠ Warning:** Avoid open the enclosure under the condition of live, and do not adjust and maintain the pump under this condition, necessary maintenance must be performed by qualified service engineers authorized by manufactures.

### 2.2 Installation for Bracket

The versatile bracket enables mounting the pump on special infusion pole. The pump can be installed to the infusion pole in three ways:

- To the right of the pump
- To the left of the pump
- At the back of the pump

**⚠ Warning:** before installing the pump to the infusion pole, please check the stability of the infusion pole.

The fixed mode of versatile socket can be changed (horizontally or vertically). The two parts are fixed with four screws, shown as Figure 2-1. Take out the four screws with the screwdriver, and rotate 90°, tighten the screws, then the socket can be switched (horizontally or vertically).



Figure 2-1 Fixed mode

### 2.3 Preparation before Operating

- 1) Open the packing.
- 2) Place the pump on the mobile infusion pole or fix it to the versatile bracket.
- 3) Connect the power cord to the AC socket with grounded end.
- 4) Insert the IV set into the pump.

#### Attention:

- ⚠** If the pump is received just now or the pump is not used for a long time (the battery power is used up, please use it for working after fully charging), please wait for five minutes to

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operate it after connecting it to the AC.

- When it is carried from the environment where the temperature is below 0 °C to room, please operate it after 15 minutes.

### 2.3.1 Installation for the IV set

Steps are as below:

- 1) Before installing the IV set, select the type of IV set according to the infusion pump.
- 2) Fix the pump to the bracket.
- 3) Prepare for the IV set and infusion bottle, hang the bottle to the infusion pole.
- 4) Infuse the liquid to the one-third of the drip cup.
- 5) Open the roller clamp and the venthole to make the liquid flow, Release all air from the pipeline.
- 6) Close the roller clamp to prevent freely flowing.
- 7) Put up the handle to open the pump door.
- 8) Make sure the drip cup locates on top of the pump, and the infusion direction is the liquid input(the mark indicated on the pump is composed of liquid drop and arrowhead, which indicates the liquid flows following the arrowhead direction, please pay attention to it), nor output direction.
- 9) Push the IV set into the air bubble detector and the slot, undraw the IV set clamp, place the IV set into it, and release the IV set clamp to make it fully tightened.
- 10) Close the pump door, and press the handle to make the door lack tightly.
- 11) Open the roller clamp completely and verify that there is no liquid flow.
- 12) The fluid flow will now be controlled by the infusion pump.

Attention:

- To reduce the infusion error for long-term extrusion of the peristaltic finger, the position of infusion pipeline should be changed about every one hour.
- The pump is calibrated by the disposable IV set of "Jierui" brand (with high elasticity) manufactured by "Shandong Weigao Group Medical Polymer Company Limited". before use the IV set which doesn't belong to this type but complies with national, please refer to User Manual for parameter setting and accuracy calibrating.
- After the service life, please return the products to the manufacture or disposal the products according to local regulations.
- Connection will loose if use the pipeline attaching with a sliding connector.
- Infusion accuracy may be influenced by solution consistency and proportion.

### 2.3.2 Disassembly for the IV set

Steps are as below:

- 1) Close the roller clamp, then open the pump door.
- 2) Undraw the IV set clamp and take it out, then close the pump door.
- 3) Close the pump.

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## Chapter 3 Test

### 3.1 Selection for Power Mode





Three modes of power supply are optional, which are convenient for use:

When use it normally, you can use the AC 100 V~240 V, 50/60 Hz. The internal battery can provide you enough power for short-distance or short-time emergency use. We also provide you a car power connector which can supply power with DC 12 V.

When the pump is connected to an external power supply, the internal lithium battery can be charged no matter the device is turned on or not. We do not provide external charging equipment, the lithium battery can only be charged inside the machine. When using an external power supply, in case of a sudden power failure, the system will automatically switch to the internal battery power, so the pump can work without interruption.



No matter which mode you choose, our products can provide you an accurate infusion.

#### Attention:

-  When the pump works with internal battery, but the battery power is lower than its one-fourth (  ), please do not infuse with the rate of more than 300 mL/h. As the low-battery may cause the actual infusion rate is lower than the setting.
-  The internal battery is an emergency backup power supply when the infusion pump to 500 ml/h above the speed of infusion, in order to ensure the normal operation of the infusion pump infusion speed accuracy, please use an external power supply.
-  When the device is connected to supply mains, the reliable grounding of supply mains ground wire or device ground terminal shall be guaranteed. If any doubts, the device should be operated by an internal power source.

### 3.2 Startup Test

#### Connect to the power

Connect the pump to AC power, press the power switch on the rear panel to "ON" state, and confirm that the "ON/OFF" power indicator on the top left of the  is green, which indicates that it is powered by AC. Press  for 2 seconds to turn on the pump, the main menu is showed as Figure 3-1:

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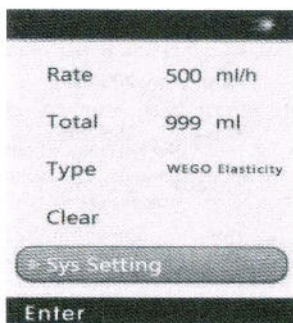


Figure 3-1 Main menu

### Set infusion rate and start infusing

In main menu, select "Rate" and press  to its setting interface, shown as Figure 3-2.

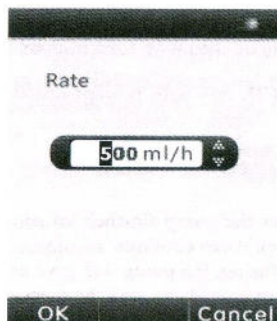










Figure 3-2 Interface for setting rate

Press  or  to choose the bit to be set, press  or  to set the corresponding bit.

After finish setting, press , then the message "Are you sure to change the current rate?" appears on the LCD screen. Press  again to confirm and  to cancel the setting. then the system will return to the main menu

Press  "START/HOLD" to start infusing, the working state indicator flashes alternately on the top left corner with green, at the same time, the infused volume increases and the residual time reduces, press it again to halt operating, interface is showed as Figure 3-3:

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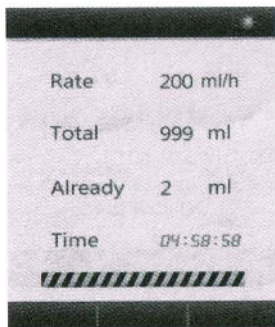




Figure 3-3 Infusion interface

### Memory function

If the pump stops or turns off during infusing, the infusion rate, total volume and infused volume will be saved, and it can maintain infusing next time.

### Prompt for a minute:

If there is no operation after turning on the pump for a minute, then the message "Do you want to start infusion?" appears on the LCD, and with prompt sound. Press  or  to release from the ALARM.


### 3.3 "NEAR END" and "KVO" Test



The KVO state refers to that, after the pump finishes infusing total volume (when the infused volume is equal to the total volume), it can continue infusing with slower rate.

- (1) 3 minutes before finishing infusing, the pump will give an alarm every ten seconds, and the working state indicator turns red for alarm, and the message "Infusion near end" appears on the LCD.
- (2) After infusing, the pump will switch to KVO state automatically, and the message "Enter KVO mode" appears on the LCD. Then the infusion rate has been set to KVO rate.

### 3.4 Air Bubble Alarm Test

- 1) Set the infusion rate to 500 ml/h.

- 2) Press  START/HOLD to start operating. Then shake the IV set to make a single air bubble artificially, the indicator turns red for alarm, and the message "Air bubble is in IV tube!" appears on the LCD, with audible alarm, and the pump stops infusing automatically.

Press  or  to release from the ALARM, and return to the main menu.

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### 3.5 Pressure (Occlusion) Alarm Test

- 1) Make sure that the drip cup locates on top of the pump.
- 2) Set the infusion rate to 500 ml/h. Press  START/HOLD to start operating.
- 3) Close the roller clamp of the IV set. This will cause downstream occlusion.
- 4) After a few seconds, the working indicator turns red for alarm. Then the message "IV tube is block!" appears on the LCD screen, with audible alarm, then stop infusing automatically.
- 5) Open the roller clamp and press  or  to release from the alarm, and return to the main menu.




#### Attention:

The smaller the infusion rate is set, the longer the time for "IV tube is block" is checked.

### 3.6 Door Open Alarm Test

- 1) Press  START/HOLD to start operating.
- 2) Open the pump door. The working indicator turns red for alarm, the message "The door is open during operation!" appears on the LCD screen, with audible alarm, then the pump stops infusing automatically.
- 3) Close the pump door and press  or  to release from the alarm, and return to the main menu.

### 3.7 Motor and Communication Failure

- 1) Press  "START/HOLD" to start operating.
- 2) The working indicator turns red for alarm, the message "Motor failure!" or "Communication failure, the system will reset" appears on the LCD screen, with audible alarm, then the pump stops infusing.
- 3) Press  or  to release from the alarm, and return to the main menu.
- 4) Press "ON/OFF" to turn off the device, then turn on again, if the alarm still exists, please contact the dealer or the manufacturer.

### 3.8 Switch for Power Mode

- 1) Disconnect the power cord from the AC socket.
- 2) Make sure that the power indicator turns green to yellow, which indicates that the pump is working with internal battery.
- 3) Insert the power cord into the AC socket again.
- 4) Verify that the power indicator turns yellow to green, and the charging indicator becomes green.

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**Attention:**


 Two conditions for battery alarm:


- 1) When working with internal battery, at least thirty minutes before the pump stops infusing for no power, it will give an alarm every ten seconds and the working state indicator turns yellow for alarm, the message "Low battery, please recharge it in time!" appears on the LCD, and with audible alarm.
- 2) When working with internal battery, three minutes before the battery runs out, the indicator turns red for alarm, and the message "Battery empty, the system will turn off!" appears on the LCD, and with audible alarm, stop infusing.


**Attention:**

 The pump alarm includes two levels: high priority and low priority. High priority alarm, which is most serious alarm, means that patient is in life-threatening danger or the pump occurs critical technical problem. Low priority alarm means general warning.

 The level of all technical alarm and general alarm is set by system, which can't be changed by users.

 Range of alarm sound pressure: 49.33 dB~59.15 dB

 Before use, the operator shall make sure whether current alarm setting is suitable for every patient.

 Once activated, the alarm will response immediately with no alarm delay. Within the range of 4m away from the pump, alarm indicator light can be seen and alarm sound can be heard.

**Alarm list is shown as below:**

Name	Level	Type	Sound characteristic	Light characteristic
Air bubble alarm	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Occlusion alarm	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Door open alarm	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Communication failure alarm	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Motor failure alarm	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Alarm of pressure test fault	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red
Alarm of door test fault	High priority	Technical alarm	Sound mode: "beep-beep-beep---beep-beep, beep-beep-beep---beep-beep"	Indicator light flashes in red

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Infusion end alarm	High priority	General alarm	Sound mode: “beep-beep-beep---beep-beep, beep-beep-beep---beep-beep”	Indicator light flashes in red
Battery empty alarm	High priority	General alarm	Sound mode: “beep-beep-beep---beep-beep, beep-beep-beep---beep-beep”	Indicator light flashes in red
Standby reminder	Low priority	General alarm	Sound mode: “beep-beep-beep”	Indicator light lighting in yellow
Infusion near end alarm	Low priority	General alarm	Sound mode: “beep-beep-beep”	Indicator light lighting in yellow
Low battery alarm	Low priority	General alarm	Sound mode: “beep-beep-beep”	Indicator light lighting in yellow
KVO mode reminder	Low priority	General alarm	Sound mode: “beep-beep-beep”	Alarm indicator light lighting in yellow

### Warning:

- ⚠ Do not set the alarm limit too close to the limit, otherwise the alarm system won't work.
- ⚠ When ambient noise is higher than the alarm volume, there will be a potential hazard.
- ⚠ If different alarm presets are used for the same or similar equipment in any single area, there will be a potential hazard.

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# Chapter 4 Start and Stop Infusing

## 4.1 Turn on the Pump

- 1) Connected the pump to AC power, press the power switch on the rear panel to "ON" state.
- 2) Press "ON/OFF" for two seconds to turn on the pump, and then enter the main menu.

## 4.2 Setting for Total Volume

In main menu, press "Up" or "Down" to select "Total", then press  to its setting interface, shown as Figure 4-1.

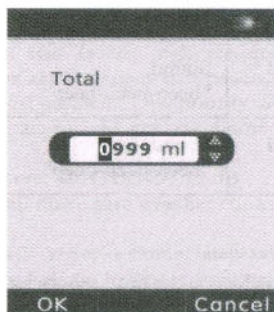









Figure 4-1 Interface for setting total volume

Press  or  to select the bit to be set, press  or  to set. The total volume value can be set from 1ml to 9999 ml.

## 4.3 Setting for Infusion Rate

In main menu, press  or  to select "Rate", Press  to its setting interface, shown as Figure 4-2:

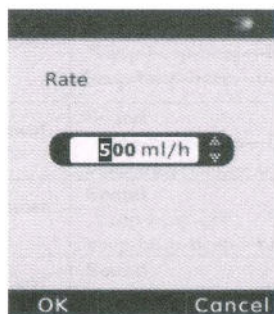


Figure 4-2 Interface for setting infusion rate

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Press  or  to select the bit to be set, press  or  to set. The rate value can be set from 1 ml/h to 699 ml/h.

#### 4.4 IV Set Type

In main menu, press  or  to select "Type", press  to enter the interface for inputting password, shown as Figure 4-3.

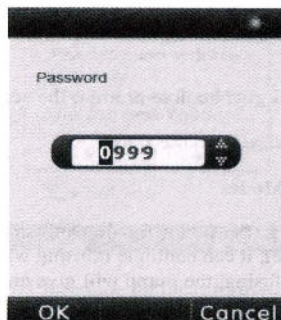


Figure 4-3 Interface for inputting password

After inputting the password "8888", the system will enter the interface for setting type, shown as Figure 4-4.

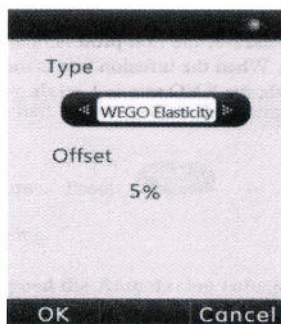




Figure 4-4 Interface for setting type

Press  or  to select the IV set type, the corresponding offset and rate will be displayed when you choose different IV sets.

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## Attention

The password can only be set by medical personnel, who saves it carefully.

### 4.5 START/STOP the Pump

After setting the "Rate", "Total" and "Type", press  "START/HOLD" to start operating.

Then the infused volume will increase while the remained time decreases. Press

 "START/HOLD" again to stop infusing and return to the main interface.

### 4.6 Release from Alarm

When alarm occurs, the pump will give audible prompt, the screen shows the reasons for alarm.

Press  or  to release from the alarm.

### 4.7 "NEAR END" and "KVO" Modes

The KVO state refers to that, after the pump finishes infusing total volume (when the infused volume is equal to the total volume), it can continue infusing with slower rate.

- (1) 3 minutes before finishing infusing, the pump will give an alarm every ten seconds, and the working state indicator turns red for alarm, and the message "Infusion near end" appears on the LCD.
- (2) After infusing, the pump will switch to KVO state automatically, and the message "Enter KVO mode" appears on the LCD.

- (3) Press  START/HOLD to end KVO mode.

**Attention:** KVO rate can be adjusted according to actual requirement by professional doctor, range is 1 ml/h~5 ml/h. To avoid hazard, the non-professional doctor is not permitted to adjust the rate, its default value is 5 ml/h. When the infusion rate is more than 5 ml/h, the KVO rate is 5 ml/h, and when it is less than 5 ml/h, the KVO rate is 1 mL/h.

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## Chapter 5 Infusion Functions

### 5.1 Clear "INFUSED VOLUME"

When the pump stops working, select "Clear" in main menu. Press , then the message "The infused volume is XXXX ml, Are you sure to clear the accumulated Volume?" appears on the LCD. Press  to clear, press  to cancel. Shown as Figure 5-1:

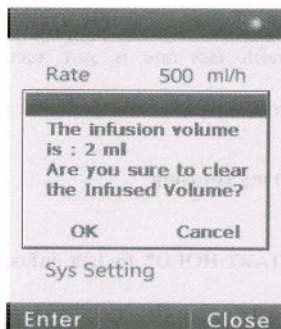





Figure 5-1 Interface for clear infused volume



### 5.2 Accumulation for the Infused VOLUME

The pump can accumulate the infused volume. When replacing the medicine, it accumulates all volume that was infused to the patient and displays the total volume to be infused to the patient. If need to accumulate the infused volume from zero, follow section 5.1 to clear the Infused Volume.

### 5.3 Changing "TOTAL VOLUME" during Infusing

Press  "START/HOLD" to halt infusing, then the pump returns to the main menu, Press "Total" to reset the total volume. Press  to save the settings. Press  "START/HOLD" to continue infusing.

### 5.4 Transient Rapid Injection, Speed the Rate during Infusing

Press  to purge the IV set pipeline under the condition of non-infusion. And when the infusion is halted, press  to infuse to the patient rapidly, infusion rate is 900 ml/h.

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Releasing the key to stop purging or high-dose injection! (after alarm, High-dose injection can not be used immediately, it can be used again after all troubles are solved).




### Warning:

-  Don't infuse to the patient with too fast rate.
-  While purging, the Air Sensor is deactivated.(please use it carefully)



### Attention:

-  The medicine infused with fast rate is not accumulated into the "INFUSED VOLUME".
-  When the pump works with internal battery, avoid using rinse or rapid infusion in low battery state.

## 5.5 Changing Infusion Bottle during Infusing

During infusing, press  "START/HOLD" to halt infusing, unplug the IV set from the solution container, and insert into new one. In main menu, the liquid volume in new solution container is accumulated to total volume, press  to confirm current total volume, and the system returns to the main menu. Make sure the infusion rate is right, press  "START/HOLD" to recover infusion.

### Attention

-  To keep clear, don't touch the port of the IV set with hands.
-  During replacing the infusion bottle, the medical personnel should check whether there is air bubble in the pipeline. If found, please operate it after remove all air bubbles.

## 5.6 Moving Patient

Infusion can be carried out usually during patient moving process.

Disconnect the power cord. The pump will continuously work with internal battery. Then make sure that the pump, power cord and the IV set are securely fixed to the IV pole firmly.

**Attention:** Do not let the pump swing excessively during patient moving. AC is used in normal state, the internal battery is only used for short-time moving. When the pump only works with internal battery and low battery, please avoid use high speed or long-time infusion.

## 5.7 External DC Power Supply

Infusion pump can connect an external DC, battery or vehicle for power supply, before use, please make sure the voltage is 12 V.

## 5.8 Noise and Heat

The motor sends a slight electrical noise when operation.

When the temperature exceeds 30 °C, its surface will have a slight fever after operating for a long time.

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## Chapter 6 System Settings

In main menu, press  or  to select "Sys Setting", press  to enter its setting interface, input password firstly, refer to section 4.3 for details. Pressure threshold, Air Bubble threshold, Volume, Brightness, Style and Parameter calibration display in this interface, shown as Figure 6-1:

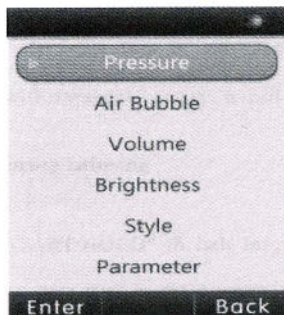









Figure 6-1 System setting

### 6.1 Pressure Threshold



Pressure Sensor detects the liquid pressure in the IV set. Pressure threshold can change the pump's maximum pressure. The pump will alarm and stop infusing when the IV set is blocked and arrived to the pressure threshold preset.

#### To set the pressure threshold:

In the main menu, press  or  to select "Pressure", Press  to enter its setting interface shown as Figure 6-2:

Press  or  to set the pressure value. After setting its value, press , then the message "Are you sure to change the current Pressure Threshold?" appears on the LCD, press  again to save the setting.

#### Attention:

-  The pump has been set to the optimal pressure before leaving factory, if no particular need, please don't change it and its value optionally, to avoid injury to patients.
-  Due to the effect to the IV set and infusion liquid by temperature, the alarm limit of pressure may become larger (smaller) when temperature rises (drops). According to the

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specific needs and the degrees of temperature dropping (rising), it is appropriate to decrease (increase) the pressure threshold of alarm.

## 6.2 Air Threshold

Air Bubble Detector is used to detect the IV set mixed into the air. Air bubble threshold can change allowable maximal air volume. During infusing, the pump will alarm when the air bubble in the IV set exceeds its alarm value preset, then stop infusing.

Alarm threshold for air bubble can be adjusted, steps are as following: in "Sys setting" interface,




press  or  to select "Air Bubble", press  to its setting interface shown as

Figure 6-2.

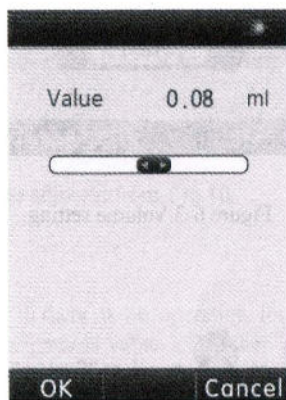







Figure 6-2 Interface for setting air bubble threshold

Press  or  to adjust the air bubble threshold, After setting its value, press ,

then the message "Are you sure to change the current Air Bubble Threshold?" appears on the LCD, press  again to save the setting.

### Attention:

 The pump has been set to the optimal pressure before leaving factory, if no particular need, please don't change it and its value optionally, to avoid injury to patients.

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## 6.3 Volume Control

In "Sys Setting" interface, Use  or  to select "Volume". Press  to its setting interface shown as Figure 6-3:

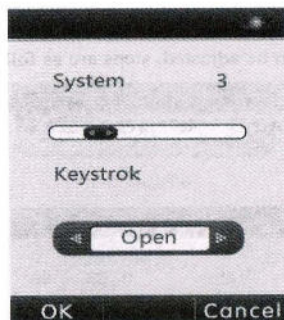












Figure 6-3 Volume setting


### 6.3.1 System Volume

In "Volume" interface, Press  or  to select "System", press  or  to adjust the volume which can be adjusted from one to ten. Finally press  to save the setting. Alarm volume is 6 as default. If the volume is changed, user can adjust it according to method mentioned above or restore factory settings to recover volume default setting.

### 6.3.2 Keystroke Volume

In "Volume" interface, Press  or  to select "Keystroke", press  or  to adjust its state. Finally press  to save the setting.

#### Attention:

-  The switch state of keystroke volume does not affect the system volume, system volume always remains "ON" state.

## 6.4 LCD Brightness

The LCD BRIGHTNESS is changeable.

Steps are as following: in "Sys Setting" interface, Use  or  to select "Brightness",

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press  to its setting interface shown as Figure 6-4:

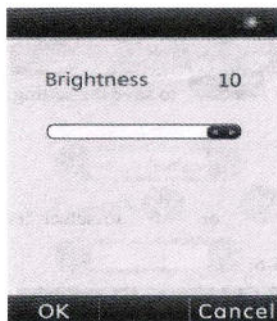








Figure 6-4 Interface for setting brightness

Press  or  to adjust the brightness. After setting its value, Press  to save the setting. The brightness value can be adjusted from 1 to 10.

#### Attention:

 The brightness protection: if there is no operation for 40 seconds, the brightness will change automatically, the brightness value is 3. When operate it again, please press any key to cancel the brightness.

### 6.5 Style

In "Sys Setting" interface, Use  or  to select "Style". Press  to its setting interface shown as Figure 6-5:

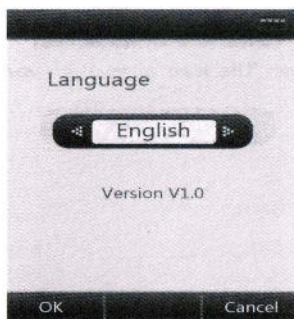


Figure 6-5 Style setting

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### 6.5.1 Language

In "Language" setting interface, use  or  to select "Language". Press  or  to select different languages, press  to save the setting.

### 6.6 Parameter Calibration

In "Sys Setting" interface, Use  or  to select "Parameter". Press  to its setting interface shown as Figure 6-6:

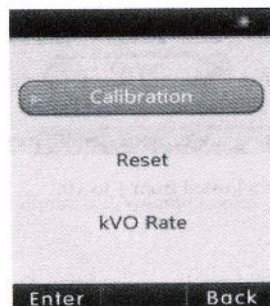





Figure 6-6 Parameter setting

#### 6.6.1 Parameter Calibration

In "Parameter" setting interface, Use  or  to select "Calibration", press  to its setting interface shown as Figure 6-7:

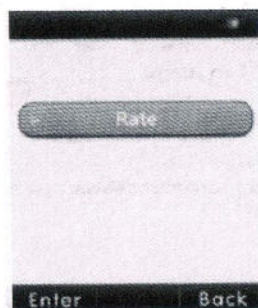


Figure 6-7 Parameter calibration

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Use  or  to select "Rate", press  to its setting interface shown as Figure 6-8:

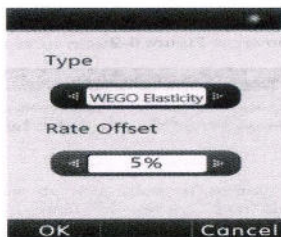













Figure 6-8 Rate calibration

Use  or  on the panel to select different items. Press  or  to adjust the corresponding setting. After finish settings, press  to save the setting, then the message "Are you sure to change the current parameter?" appears on the LCD, press  to confirm again.




#### Attention:

 The IV set should be in consistent with the current type in using. See Section 6.6 "Parameter Calibration" for the calculation methods of velocity offset and drop/h.

#### 6.6.2 Reset

In "Parameter" setting interface, Use  or  on the panel to select "Reset", press , then the message "Are you sure to reset all?" appears on the LCD screen. Press  to confirm.

#### 6.6.3 KVO Rate

In "Parameter" setting interface, Press  or  to select "KVO Rate", then press  to its setting interface shown as Figure 6-9:

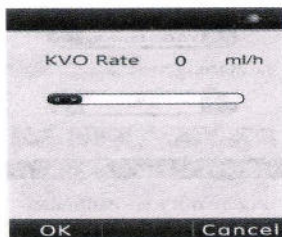






Figure 6-9 Interface for setting KVO rate

Press  or  to set KVO rate, the default is 5 ml/h. After finish settings, press , then the message "Are you sure to change the KVO rate?" appears on the LCD. Press  to confirm.

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## Chapter 7 Calibration for IV Set

The accuracy largely depends on the IV set. Material and specification chose by the different manufacturers were different, so in order to ensure the accuracy, the different brands of IV set have each infusion parameter. A new brand must be calibrated and it can not be used until validated that it is in the allowable error range.

The above work will be completed by the supplier or dealer.

Local suppliers have obligation to provide a database including the common brand of the IV set. The user should tell his IV set brand to the supplier before purchasing the pump.

### 7.1 Infusion Accuracy

Infusion accuracy refers to under the condition of setting the infusion rate, the difference between the actual infusion volume and set volume, then divided the set volume percentage, which is presented as follows:

Infusion accuracy = (actual infusion volume - set volume) / set volume  $\times$  100%

### 7.2 IV Set Requirements

The physical diameter size is 3.5 mm–4.3 mm.


The IV set contained Silicon rubber: High flexibility with infusion material, relative stable with physical properties, and doesn't change with the change in ambient temperature, the calibration accuracy can be achieved to  $\pm 5\%$  below after calibration.

Ordinary PVC (polyvinyl chloride): the IV set with less flexibility can not be fully recovered the original state after being extruded, the diameter size of the IV set will increase gradually with the extrusion frequency and infusion time increasing, the accuracy is about  $\pm(5-15)\%$  after calibrating.


Hard PVC (polyvinyl chloride): the IV sets have not flexible, it is not recommended to use in infusion pump. As it hardly can be recovered the original state after being extruded.


### 7.3 Selection for IV Set

Each pump provides a IV set for special use and two blank brand for selecting. When connected

to the power, press  "ON/OFF" to turn on the pump, and then the current IV set information appears on the LCD. If the displayed brand is the same with the current using, you needn't to reset. Otherwise, please see section 4.4 to reset the brand name.

#### Attention:

 As the IV set class is various, the using type is different, and the special IV set names are set basing on the user's demand before leaving factory. So before purchasing the pump, you'd better tell your IV set brand to the dealer or manufacturer, which is convent to input your brand parameters to the pump in advance.

 The IV set name must be in consistent with the using, or it will lead the inaccurate

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accuracy.



If the IV set brand you want to calibrate is not in the special area, you need not tell the using brand to the dealer but calibrate it in "A" or "B" Channel.









## 7.4 Calibration for IV Set

The pump sets infusion rate with "mL/h", also intituled "volume mode" infusion and its calibration is "rate".

### 7.4.1 Calibration for "Rate"

The calibration method of the infusion rate (mL/h) is called "rate" calibration.

#### Calibration steps:

- (1) In "Rate" setting interface. The IV set brand to be calibrated and the corresponding rate offset display on the LCD.
- (2) If the brand to be calibrated is not in the range, press  or  to select "Universal", and press  or  to select "Offset". Then press  or  to modify the current offset value, and its adjustment range is from -30% to 30%.
- (3) Press , then the message "Are you sure to change the current parameter?" appears on the LCD, press  again to confirm.

#### Offset adjustment principles:

Infusion rate offset (N %) can be calculated according to measurement and calculation. Formula is as following:

$$N\% = \frac{[(\text{theoretical fluid volume} - \text{the actual measurement volume}) \div \text{actual fluid volume}] \%}{\text{Formula 1}}$$




Modify the rate offset value directly in the "Offset" interface according to the calculated value with formula 1.

#### Application examples:

Suppose to infuse with some IV set, infusion rate is 50 ml/h, infusion measurement time is 60 minutes, the actual measurement volume is 56 ml, then calculate the rate offset(N%) and complete the calibration.

The first step is to calculate the rate offset: Calculate the "theoretical fluid volume" in the thirtieth minute, theoretical fluid volume=50 ml/h×1 h = 50 ml. Then according to the formula 1 to calculate the rate offset(N%) =  $[(50 \text{ ml} - 56 \text{ ml}) \div 50 \text{ ml}] \% = -12\%$ .

The second step is to input the offset value: According to the above calculated offset value, press

 or  to set the offset value to -12% in "Rate" interface. Press  to confirm,

then the calibration is completed.

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## Chapter 8 Maintenance

Please use the pump carefully as it is a good design equipment. Taking the following methods to maintain it to prolong the life of the unit.

### 8.1 Cleaning and Disinfection

The patient contact parts (such as pump door, hook, etc) must be periodically cleaned and disinfected by medical personnel, the cleaning and disinfection methods are as following:

**Cleaning:** Clean the pump with a soft cloth soaked in a solution of soap, and wipe clean with a dry cloth immediately.

**Disinfection:** Use a soft cloth soaked in alcohol (concentration: 75%) to wipe the pump door and check probe for air bubble, finally wipe clean with a dry cloth immediately.

### 8.2 Period Maintenance

when use the specific power supply for charging, the charger shall meet the requirements of IEC60601-1

#### 8.2.1 Inspection for Infusion Volume

Use graduated cylinder and stopwatch to check flow volume every six months.

#### 8.2.2 Inspection and Maintenance for Built-in Battery

When the battery is fully charged, the pump can work for more than 4 hours continuously at the infusion rate of 25 ml/h with internal battery. It needs about 8 hours for fully charged when it runs out. It is better to keep the battery in charging condition when the pump at non-working mode. If the pump is not used for a long period, please charge it every 3 months until the charging indicator indicating it is fully charged. When the pump is stored for a long time, it should be connected to the AC power supply for 5 minutes before turning on.

Batteries belong to expendables. They must be replaced when they are used up. If necessary, please contact its distributor or the manufacturer. Model: Lithium polymer battery (7.4 V, 3500 mAh).

In order to ensure the battery performance and prolong its life, every month medical personnel should take a test of battery running out until the pump automatically shut down. Then, for future use, charge the pump until the charging indicator indicating it is fully charged.

#### Take the following steps to check the batteries every 4 months:

- 1) Connect to AC, charge the battery to fully charged;
- 2) Turn on the pump and install the infusion set;
- 3) Set the infusion rate to 25ml/h, then start infusing;
- 4) Keep the pump working till it turns off for low battery.
  - ◆ The battery is in good condition if, the pump takes more than 4 hours from starting infusing to low battery (alarming); it takes more than 30 minutes from low battery (alarming) to running out; and more than 3 minutes from battery running out to automatic shutdown.
  - ◆ If one or more of the above duration doesn't met the requirement, the battery is near the end of its service life. Contact the dealer or the manufacturer for battery replacement.

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- 5) After checking the battery, recharge the battery to fully charged for use next time.

Battery life depends on its use of frequency and time. The cycle life of the lithium battery in this device is 300 times. If the number exceeds 300 times, it is recommended to replace the battery or carry out the above inspection every month. If the maintenance and storage of the battery is appropriate, its service life will be about 3 years. While if used improperly, its service life may be shortened. For the battery has been used over 3 years, we recommend to replace the battery or carry out the above inspection every month.

### 8.2.3 Inspection for Fuse

Check the fuse when the pump can not work with AC. Check the fuse (in AC socket), replace the broken fuse with the accompanying one. When both of the two fuses are broken, please contact the dealer.

### 8.3 Handling and Recycling

The pump has normal life for five years, it needs to be discarded over the service life.

Please return the used lithium polymer battery to the dealer or manufacturer, or dispose them according to applicable regulations. Do not disassemble the battery or throw it into fire, water or short circuit, otherwise there will be burning, explosion, leakage or risk of personal injury.

The dealer or our office will recycle the used pump.

Please contact manufacturer or dealer for more relevant information.

### 8.4 Disposing and Recycling for the IV Set

The brand of the IV set preset by the pump is "Jierui" (with high elasticity) manufactured by "Shandong Weigao Group Medical Polymer Company Limited". This IV set is disposable, and can not be used repeatedly. Please dispose the used IV set according to local laws and regulations.

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# Chapter 9 Infusion Characteristics

## 9.1 Accuracy Characteristics

The infusion accuracy curve indicates the infusion change in a certain period after starting infusing and the performance achieves a normal infusion volume. The curve adopts the brand of "Jierui" (with high elasticity) manufactured by "Shandong Weigao Group Medical Polymer Company Limited" for testing, which was used as an important symbol of the overall characteristics. (middle rate: 25 ml/h, hereinafter test with middle rate).

### Test environment and condition

Temperature: +5 °C~+40 °C

Relative humidity: 20%~90%

Atmospheric pressure: 860 hPa~1060 hPa

### Start Curve

It is drawn according to the data of two hours testing circle.

Sample interval:  $\Delta t=0.5$  minute    infusion volume:  $Q/(ml/h)$     testing circle= 120 minutes

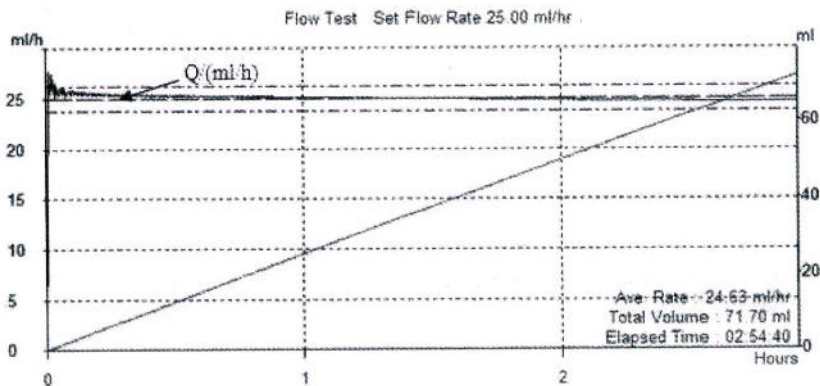


Figure 9-1 Accuracy characteristics curve

### Horn-shaped curve

Short-term infusion volume error:  $(p\Delta t)$

Sample interval:  $\Delta t=0.5$  minute

Observation window duration:  $p\Delta t=2, 5, 11, 19, 31$  minutes

The total average percentage of measured infusion volume error:  $A(\%)$

The minimum testing error of observation window within given time: EP min (%)

The maximum testing error of observation window within given time: EP max (%)

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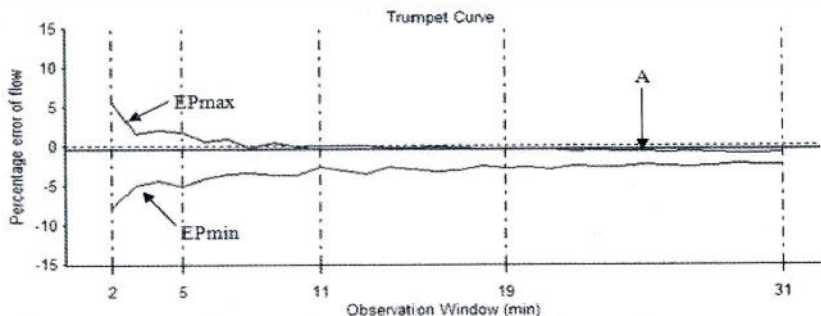


Figure 9-2 Horn-shaped curve

#### Attention:

- ⚠ Infusion accuracy does not reflect the clinical standard, such as age, weight and other drugs the patient uses.
- ⚠ Infusion accuracy may be affected by environmental conditions (pressure, temperature, the IV set, etc.)

### 9.2 Occlusion Response Characteristics

Blocking alarm time is an important guideline of the occlusion response, the pump adopts the brand of "Jierui" (with high elasticity) manufactured by "Shandong Weigao Group Medical Polymer Company Limited" for testing, its data only represents the conclusion of the current measurement. The pump takes on the function of pressure release, the pipeline pressure system will automatically release when occlusion alarm appears.

Occlusion alarm time was influenced by infusion rate, IV set brand, IV set specification, infusion solution, infusion pipeline length, external pressure, etc. The pump has been set to the optimal characteristic before leaving factory, if no particular needs, please don't adjust the pressure value.

Rate(ml/h)	1	25	100	250	500	699
Alarm Grade	—	—	—	—	—	—
Occlusion Pressure (kPa)	230	230	230	230	230	230
Occlusion Alarm Time	31min	1min 01sec	16sec	7sec	5sec	3sec

#### Occlusion Bolus dose

It produces about 1 ml bolus dose under the atmospheric pressure of 130 kPa, and 2 ml bolus dose under the atmospheric pressure of 270 kPa (the result is the average of measuring for many times, which is used for reference).

### 9.3 Recommended IV Set and Infusion Component

The pump is calibrated by the disposable IV set of "Jierui" brand (with high elasticity) manufactured by "Shandong Weigao Group Medical Polymer Company Limited". If you use other brands of the IV set, please refer to the User Manual for calibrating the IV set parameter, or tell your IV set brand to the dealer who can help calibrate it.

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## Chapter 10 Electromagnetic Compatibility and Interference

The pump can prevent external interference, including high-intensity radio frequency radiation, magnetic and electrostatic. However user should avoid using the mobile phone away the device within a distance of 0.5 meter.

The pump will not interfere the surrounding electronic equipment as it is low electromagnetic frequency. However, it will bring some electromagnetic radiation which complies with standard IEC/EN 60601-1-2 and IEC/EN60601-2-24. If the interference brings when use the device with other equipments, you must take measures to reduce this interaction, such as relocate the location of the two devices.

Avoid using this pump with MRI (Nuclear Magnetic Resonance Image) or analogous medical equipments together, otherwise the electromagnetic interference will cause system failure or system collapse.

Ensure that the environment in which the pump is used is not subject to any sources of strong electromagnetic field, such as mobile telephones, etc. Otherwise the electromagnetic interference will cause system failure or system collapse.

### • Technical Description Concerning Electromagnetic Emission

#### Guidance and manufacturer's declaration – electromagnetic emission

The *SP750* is intended for use in the electromagnetic environment specified below. The customer of the user of the *SP750* should assure that it is used in such and environment.

Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The <i>SP750</i> uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF emission CISPR 11	Class B	The <i>SP750</i> is suitable for use in all establishments, including domestic establishments and those directly
Harmonic emissions IEC 61000-3-2	Class A	connected to the public low voltage power supply
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	network that supplies buildings used for domestic purposes.

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# Technical Description Concerning Electromagnetic Emission

## Guidance and manufacturer's declaration – electromagnetic immunity

The *SP750* is intended for use in the electromagnetic environment specified below. The customer or the user of *SP750* should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge(ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV different mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment
Voltage dips, short interruptions and voltage variations on power supply input lines IEC610000-4-11	<5%UT (>95% dip in UT) for 0.5 cycle 40%UT (60% dip in UT) for 5 cycle 70%UT (30% dip in UT) for 25 cycle <5%UT (>95% dip in UT) for 5 sec	<5%UT (>95% dip in UT) for 0.5 cycle 40%UT (60% dip in UT) for 5 cycle 70%UT (30% dip in UT) for 25 cycle <5%UT (>95% dip in UT) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the SP750 requires continued operation during power mains interruptions. It is recommended that the SP750 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz)magnetic field IEC 61000-4-8	3 A/m	3 A/m	Mains power quality should be that of a typical commercial or hospital environment

NOTE UT is the a.c. mains voltage prior to application of the test level.

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# Guidance & Declaration – electromagnetic immunity concerning Conducted RF & Radiated RF

## Guidance & Declaration – electromagnetic immunity

The *SP750* is intended for use in the electromagnetic environment specified below. The customer or the user of *SP750* should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the <i>SP750</i> , including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. <b>Recommended separation distance</b> $3 \text{ V}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$D = 1.2XP^{1/2}$ 80 MHz to 800 MHz $D = 2.3XP^{1/2}$ 800 MHz to 2.5 GHz Where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and $d$ is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, <sup>a</sup> should be less than the compliance level in each frequency range. <sup>b</sup> Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the **SP750** is used exceeds the applicable RF compliance level above, the **SP750** should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the **SP750**

<sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

### **Recommended separation distances between portable and mobile RF communications equipment and the model SP750**

#### **Recommended separation distances between portable and mobile RF communications equipment and the model SP750**

The **SP750** is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the **SP750** can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the **SP750** as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter(W)	Separation distance according to frequency of transmitter		
	150 kHz to 80 MHz $d=1.2 \times P^{1/2}$	80 MHz to 800 MHz $d=1.2 \times P^{1/2}$	800 MHz to 2.5 GHz $d=2.3 \times P^{1/2}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in metres(m) can be estimated using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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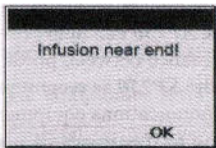
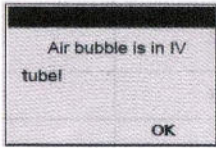
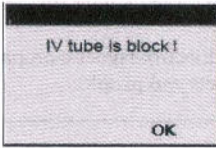
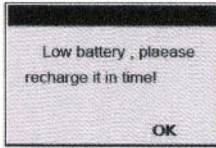
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## Chapter 11 Troubleshootings

Trouble	Interface display	Possible Reason	Solution
Alarm for infusion near end		Preset infusion volume has been completed	Press "START/HOLD" button to stop the infusion and the alarm. Then clear the infused volume in the main menu and press "START/HOLD" button to restart infusing.
Air bubble alarm		<ol style="list-style-type: none"> <li>1 Air bubble in the tube.</li> <li>2 Infusion tube installation error</li> <li>3 Something wrong with the sensor</li> </ol>	<p>Solution for No.1: Press "START/HOLD" button to stop the infusion and the alarm. Remove the air bubble manually in the tube and then press "START/HOLD" button to restart infusing.</p> <p>Solution for No.2: Reinstall the infusion tube.</p> <p>Solution for No.3 Contact customer service.</p>
Occlusion alarm		<ol style="list-style-type: none"> <li>1 Infusion occlusion.</li> <li>2 The occlusion value is too sensitive</li> <li>3. Something wrong with the sensor.</li> </ol>	<p>Solution for No.1: Press "START/HOLD" key to stop the infusion and the alarm. Remove the occlusion and then press "START/HOLD" button to restart infusing.</p> <p>Solution for No.2: Refer to the User Manual "Pressure Threshold".</p> <p>Solution for No.3: Contact customer service.</p>
Warning for low battery		<ol style="list-style-type: none"> <li>1. Too low battery</li> <li>2. Battery aging or something wrong with the battery charge circuit.</li> </ol>	<p>Solution for No.1: Connect the pump to the AC/DC to charge the battery.</p> <p>Solution for No.2: Contact customer service.</p>

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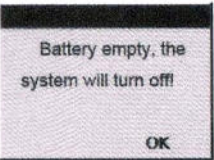
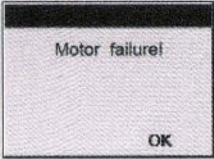
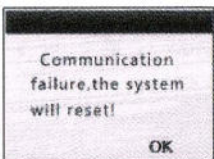
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Alarm for no power		1. The battery power is used up. 2. Battery aging or something wrong with the battery charge circuit.	Solution for No.1: Connect the pump to the AC/DC to charge the battery.  Solution for No.2: Contact customer service.
Alarm for motor failure		1. Infusion tube installation error  2. Something wrong with the motor.	Solution for No.1: Press "START/HOLD" button to stop the infusion and the alarm. Reinstall the pipeline, then press "START/HOLD" button to restart infusing.  Solution for No.2: Contact customer service.
Alarm for communication failure		Communication failure; The system can not achieve communication.	Turn the pump off, then turn on again; Please contact the dealer or manufacture.

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### 7.3 WARRANTY CERTIFICATE

western surgical product is warranted to be free from electrical and mechanical defects in material and workmanship, under normal use. The western surgical product must not have been moved from the site of original installation. A new or remanufactured part to replace the defective part will be provided without charge for the part itself, through an authorized western surgical service dealer. The replacement part assumes the unused portion of the warranty.

#### WESTERN SURGICAL WILL NOT BE RESPONSIBLE FOR:

1. Damage or repairs required as a consequence of faulty installation or application by others.
2. Damage or repairs needed as a consequence of any misapplication, negligent handling, improper servicing, unauthorized alteration, or improper operations.
3. Failure to start due to voltage conditions, blown fuses, open circuit breakers or other damages due to the inadequacy or interruption of electrical service.
4. Damage as a result of floods, winds, fires, lightning, accidents, corrosive atmosphere, or other conditions beyond the control of western surgical
5. Parts not supplied or designated by western surgical.

<b>Date of Installation</b>	<b>Installed By</b>
<b>Model No.</b>	<b>Serial No.</b>
<b>Warranty Period</b>	
<b>Name of Doctor &amp; Address :</b>	

Customer Sign. With Stamps

Marketed By: Western Surgical  
Sign. With Stamps

#### No Claim Warranty :

1) Any Defect Throughtout Power Supply

2) Any Physical Damage

3) Under Warranty Standby Unit Not Provide

4) Under Warranty When Company Send Parts or Machine we Imidiat send to Buyer.

\* Carrying Warranty at Rajkot Office only on site warranty not provided free of cost.

\* Due to constant upgradation design, price and features are subject to change any time without prior notice.

**WESTERN SURGICAL**  
*Western Surgical*

AN ISO 9001 : 2008 & ISO 13485 : 2015 AC 2012, CE, FDA & GMP CERTIFIED COMPANY

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