栢威医药
BRAND MEDITECH

# Infusion Pump User Manual
# Model: BD-8000


## ShenZhen Kang Brand Meditech Co., Ltd.

**Please read the manual before using the product.**
**Please keep the manual for reference!**

CE 0197

# Instruction

Thank you for purchasing Model: BD-8000 infusion pump.

Please read the manual carefully before using the product.

Please keep the manual for reference.

| | |
|---|---|
| Product name: | Infusion pump |
| Model： | Model: BD-8000 |
| Product performance, structure and components： | Mainly composed of shell assembly, pump assembly, boards, battery and so on. |
| Application： | It is used in hospitals where patients need to be given steady and continuous injection or precise medication. |
| Manufacturer： | Shenzhen Kang Brand Meditech Co., Ltd. |
| Registered address： | Floor 5A, Blk. A, Tempus Building, Qingshuihe 1st Street, Luohu District, Shenzhen, China |
| Manufacturer address： | Floor 5A, Blk. A, Tempus Building, Qingshuihe 1st Street, Luohu District, Shenzhen, China |
| Website: | www.brand-med.com |

# Statement

All the user manual final explanation rights belong to Shenzhen Kang Brand Meditech Co., Ltd.

Shenzhen Kang Brand Meditech Co., Ltd. has the right to revise the user manual without prior notice. The revised contents will be shown in the new version.

Shenzhen Kang Brand Meditech Co., Ltd. will be responsible for the safety, reliability and performance of the product only if all of the following requirements are met:

- ◆ Assembly, expansion, reset, improvement and maintenance should be carried out by professionals recognized by Shenzhen Kang Brand Meditech company.
- ◆ All of the components used for maintenance and accessories and disposables compatible with the pump are supplied by Shenzhen Kang Brand Meditech company originally or recognized by Shenzhen Kang Brand Meditech company.
- ◆ Related electronic devices comply with the requirements of the national standard and the user manual.
- ◆ Operation should be done according to the user manual.

# Contents

# Chapter 1 Safety

## 1.1 Safety Precautions

This chapter contains the basic safety information which users have to pay attention to and comply with during using the infusion pump. Same, similar and other related information will be described in every chapter.

| | |
|---|---|
| **Notice：** | It highlights important guideline information, which will affect how to use this user manual and this infusion pump, or provide some extra information, such as detailed explanation, clue or reminder. |
| ⚠ **Danger：** | It points out urgent danger, which will lead to death, serious personal injury or property damage. |
| ⚠ **Warning：** | It points out potential danger or dangerous operation, which will cause death, serious personal injury or property damage. |
| ⚠ **Caution：** | It points out potential danger or dangerous operation, which will cause minor personal injury, product fault, damage or property damage. |

### 1.1.1 Notice

◆ Please keep the manual for reference.

◆ Please install the infusion pump in the place where it is easy to observe, operate and maintain.

◆ The user manual gives a full introduction of most complete specifications and functions. The infusion pump you bought may not have all of the configurations or functions.

◆ The serial number of the infusion pump has been set before you buy them. Users should not change it during usage.

### 1.1.2 Danger

Straighten the infusion pump and make sure it reaches the bottom of the groove.

### 1.1.3 Warnings

- The infusion pump is used for clinical injection. It only can be used by professional clinical doctors, medical electrical experts or trained clinical doctors and nurses on specified occasions.
- Check the infusion pump and its accessories before use in order to confirm that they can work normally and safely.
- Do not use the pump in the flammable environment in case of fire and explosion.
- Please set the alarm according to the patient's actual situation. Please keep watching the patient's clinical symptoms, do not only reply on the alarm function of the infusion pump.
- Always supervise the infusion pump to check the rest volume or if there is bubble in the pipe, do not only relay on the alarm.
- In the high pressure atmosphere, such as Hyperbaric oxygen therapy, the pressure inspection may not work normally.
- Check the blood vessel to ensure it safe before infusion.
- In the infusion pipe, the occlusion caused by pipe knot and filter coagulation or intubations would cause the rise of the inner pressure of the infusion pipe. At this moment, the elimination of the occlusion may cause too much liquid to be injected to the patient's body. Proper measures should be taken to prevent too much liquid being injected into the patient's body. For example, squeeze the infusion pipe before occlusion elimination.
- The infusion pump should be used in the range of 120cm above or under the patients' heart.
- Avoid using the infusion pump when there are alarms.
- If there are more than two infusion systems connecting with one IV set, the output volume will be different with the volume you want.
- Please use the standard infusion set and extension line, contact the agency for the detailed information.
- If the IV set is not standard or the parameters' setting is not correct, it can't ensure

the accuracy, the error of accuracy will reach above 40%.

- The used accessories should be dealt with properly according to the related regulations of the hospital.
- The protection against electric shock of the infusion pump belongs to Class II . PE port of the power cord which belongs to Class I cannot be used for protection.
- The shell of the infusion pump cannot be opened. Or else there will be electric shock risk. Maintenance or upgrade of the infusion pump should be carried out by maintenance crews trained and authorized by our company.
- Please dispose the package materials according to the related laws or the rules of hospital. Package should be kept out of children's reach.

### 1.1.4 Cautions

- Please use the accessories appointed in the manual in order to ensure safety of patients.
- Take care of the cables which may make the patients twined and suffocated.
- Please do not reuse disposable accessories to avoid hypofunction and cross-infection.
- The thickness of the two-tier pipe cannot be beyond 2mm. The diameter should be between 3.5mm and 4.5mm.
- Observe if there is liquid leakage after installing the pipes and before starting infusion, if there is, check and deal with it.
- When infusion is started, the infusion pipe which is in the groove needs adjusting every 4 hours to keep the accuracy. Please change a new infusion pipe when it is used for 24 hours continuously.
- The infusion pump and its accessories should be discarded according to the related rules of local laws or the rules of the hospital, when they are about to end the service life. Please contact the distributors or manufacturer if you have any question.
- The electromagnetism will interrupt the infusion pump system, so the machines

which are used near to the pumps must meet the corresponding requirements of EMC. Cell phone, X-ray or the MRI all generate magnetic field with high intensity, so they will interrupt the pumps.

- Avoid the direct sunshine, abnormal high temperature or humidity.
- Avoid conducting high-pressure sterilization to the infusion pump or exposing it in chemical substance.
- When the build-in battery keeps working, please check whether it has enough battery for injection. Please recharge the battery when necessary.
- Pay attention to the frequency and voltage before connecting with the power supply.
- Please install and carry the infusion pump properly, avoid fall, collision, serious vibration and the damage caused by mechanical force.
- Use a piece of soft cloth drenched by warm water to clean the infusion pump.
- If the surface tension, specific gravity and viscosity of the infusion liquor (such as liquor which is mixed with surfactant) are different from the saline, the infusion accuracy may be different from the value in the reference table.
- When a rapid infusion needed (flow rate≥1000ml/h), please use a silicone pipe with the transfusion needle which is more than 0.9mm to keep the infusion accurate.
- If the infusion pump has not worked as the instruction manual describes, and the exact reason are not known (including the infusion sets, infusion volume, infusion rate, ID No, liquid type and so on) please stop using this pump and contact the agency or the manufacturer to reflect the conditions.

# Chapter 2 Product Introduction

## 2.1 Product Structure and Composition

Model: BD-8000 Infusion pump consists of the main engine and the built-in rechargeable battery.

## 2.2 Application

It is used in hospitals where patients need to be given steady and continuous intravenous infusion or precise medication.

## 2.3 System Structure

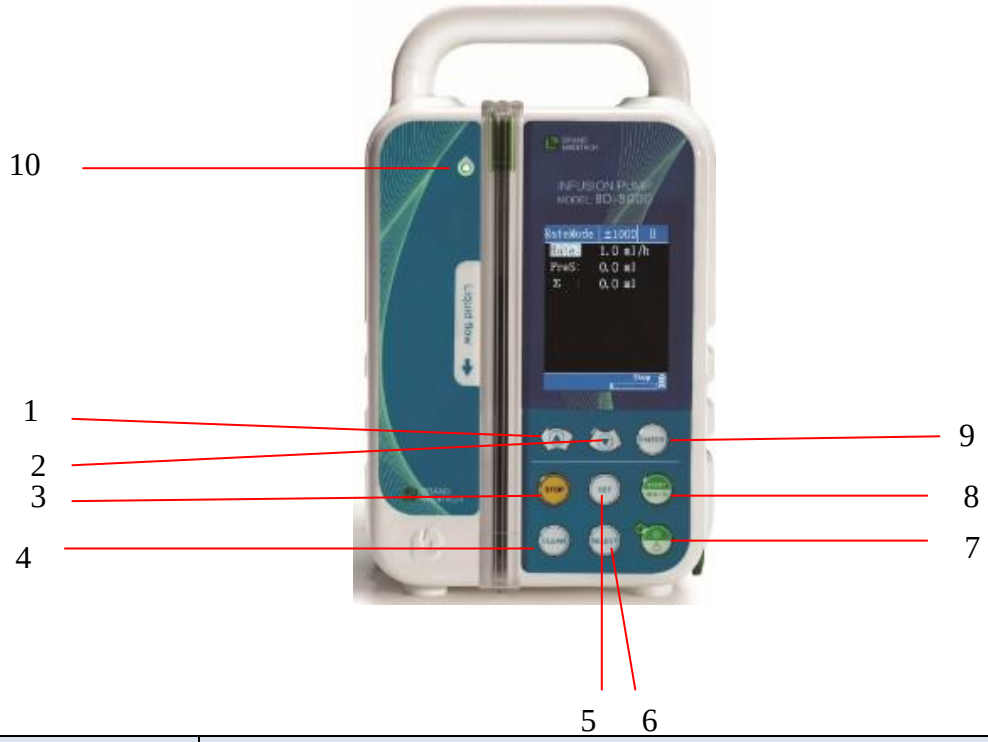
Model: BD-8000 infusion pump contains the following parts:

1) **The microcomputer system:** the “brain” of the whole system, which gives intellectualized control and management over the whole system and processes the detected signals. The two single chip Microcosm (SCM) systems are used for mutual backup copy and supervision. When one SCM goes wrong, the other one will give an immediate warning signal and cut the power of the host computer, which makes the machine stop working, and thus ensures patient's safety.
2) **The pump device:** the “heart” of the whole system and the main driving force of the infusion, which drives the peristaltic pump with stepper motor.
3) **The inspection device:** including infrared sensor (detect air bubbles inside the infusion pipe), pressure sensor (detect the pressure inside the infusion pipe), Hall sensor (detect the motor control) etc., which can give corresponding signals, which will, after being magnified, be sent to the microcomputer for signal processing. After that, a control instruction will be sent for corresponding operation.
4) **The alarm device:** after the signal received by the sensor is processed by the microcomputer, an alarm control signal will be sent, which will be responded by the alarm device to alert the user for the proper operation. There are mainly two kinds of alarms, namely the photoelectric alarm (LCD) and the sound alarm (buzzer), etc.

5) **The input and display device:** the input part is in charge of setting various infusion parameters, such as infusion volume and infusion rate, etc. The display part is in charge of displaying various parameters and shows the current operation progress on the LCD.
6) **The built-in rechargeable battery component:** this component supplies electric power to the infusion pump when the AC Power is disconnected or unavailable to ensure continuous use.

# Chapter 3 External Characteristics

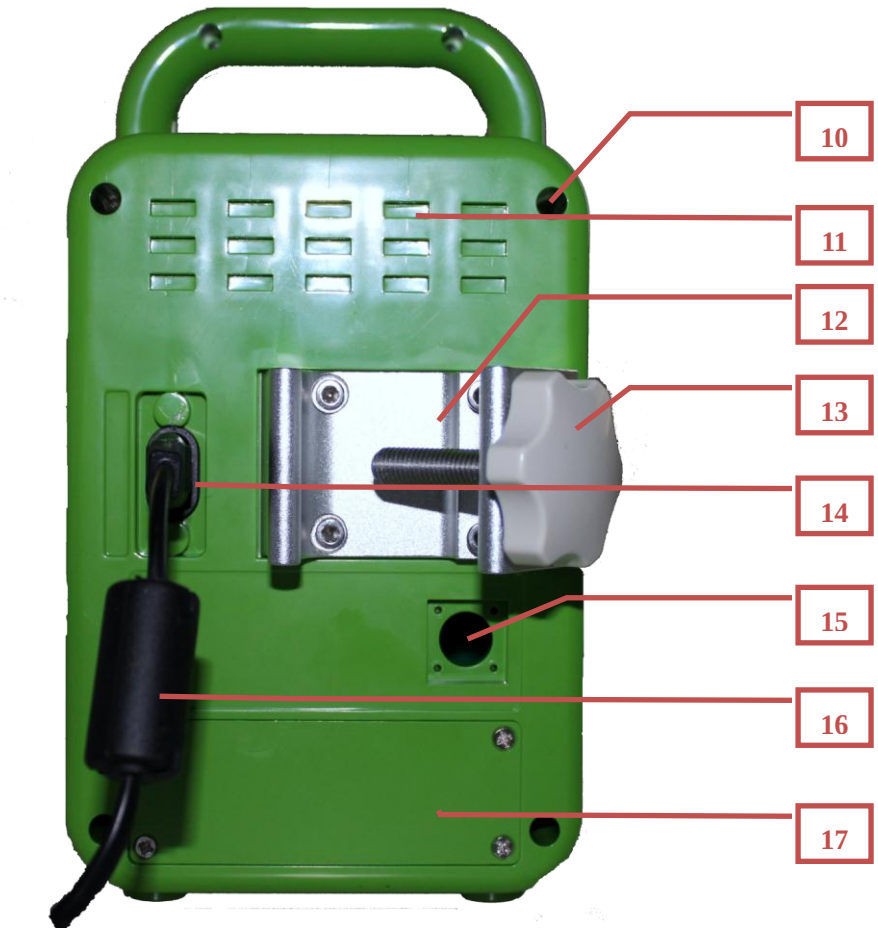
## 3.1 Front Panel Instruction




| NO. | Description | Function |
|---|---|---|
| 1 | ⇑Key | Used to select parameters to be set or increase the value of the parameters. |
| 2 | ⇓Key | Used to select parameters to be set or decrease the value of the parameters. |
| 3 | STOP/SILENCE Key | Press the key to stop the infusion and eliminate the alarm at the same time. |
| 4 | CLEAR Key | Press the key to eliminate the accumulated volume in the “STOP” status. |
| 5 | SET Key | Press the key to change the infusion mode. |
| 6 | SELECT Key | This key is used to select the unit of value change via ⇑ or ⇓Key in parameters setting. The selectable units of value change are: 0.1,1,10,100,1000. The selectable value change units of some parameters are limited to: 1,10,100,1000. |

| | | |
|---|---|---|
| 7 | POWER Key | Turn on / off the infusion pump.<br>Turn on the pump: press this key for 3～5 seconds until the screen is on.<br>Turn off the pump: press this key for about 5 seconds. |
| 8 | START/BOLUS Key | Press the key to start the infusion under the “STOP” status. Keep pressing the key during infusion to start the “BOLUS” function. (The “BOLUS” function can only be started with the flow rate≤1000ml/h), after releasing the key, the pump will run at the original infusion rate. |
| 9 | ENTER Key | Press this key to make the parameter value adjustable or save the value. |
| 10 | Operating Indicator Light | After the infusion pipe is installed properly, the operation light will be on. And it will keep flashing during infusion. |

## 3.2 Back Panel Instruction



10）Screw Holes

11）Vents

12）Pole Clamp Anticlockwise

13）Knob of the Pole Clamp Anticlockwise

14）Outlet of AC Power Supply

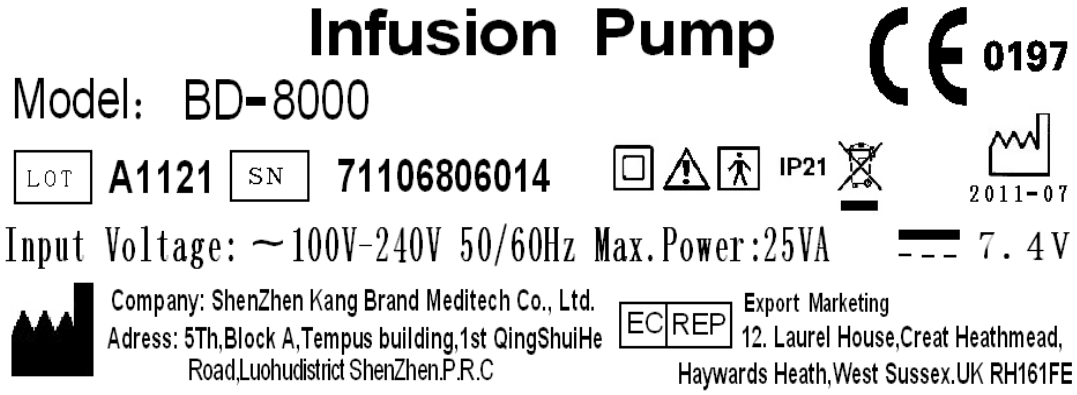
15）Multi-functional Interface: Car Power Socket

16）AC power cord

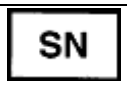
17）Battery Cover Plate

## 3.3 Packing

### 3.3.1 Product Label (pasted on the back shell of the pump)



### 3.3.2 Label Marks and Signification

| Mark | Description |
|---|---|
|   | Batch No. |
|   | Serial No. |
|  | Danger! Warnings! Caution! |
|  | Class II Equipment |
|  | Type BF Applied Part |
| **IP21** | Out Shell Protection Class |
|  | Treat with pollution-free method |
|  | Date of Manufacture |
|  | Manufacturer |
|  | Alternating Current |
|  | Direct Current |
|   | Reach the Standards of 93/42/EEC |
|  | Power Switch |
|  | Non Ionization Radiation |
|  | Caution of Rain During Transportation |
|  | Fragile, Handle with Care During Transportation |

### 3.3.3 Standard Configuration in the Packaging Case

- ◆ Infusion Pump 1 set
- ◆ AC Power Cord 1 piece
- ◆ User Manual 1 piece
- ◆ Certification 1 piece
- ◆ Pole Clamp 1 piece

**Please contact the sales agent if any of the above components is missing when you open the package.**

**Notice：**

**Please contact the sales agent if any of the above components is missing when you open the package.**

# Chapter 4 Operation Guidelines

## 4.1 Operation Flow Chart

| | |
|---|---|
| Fix the machine | Fix the infusion pump on the stable IV stand. |
| Connect to the power source | Press the  key for 3~5 seconds. |
| Install the IV set | Install the IV set. |
| Set the infusion mode and parameters | Press the ↑key or ↓key to set the infusion mode. |
| Eliminate air bubbles from the IV set | Press the START key to infuse and eliminate the air bubbles from the IV set, and then press the STOP key to stop. |
| Clear the accumulated volume | Press CLEAR |
| Infusion accessories inserted into patients | Connect Infusion accessories with patients. |
| Start the infusion | Press START |
| Infusion completion | Press STOP |
| Turn off the power supply | Press  for 3~5 seconds. |

## 4.2 Basic Operation Steps

**Step 1: Fix the Infusion Pump**

1) Rotate the knob of the pole clamp anticlockwise, and leave enough room to put the IV stand as shown in Fig 1.

2) Fix the infusion pump properly on the IV stand, and rotate the knob of the pole clamp clockwise to get the pump properly fixed on the IV stand as shown in Fig 2

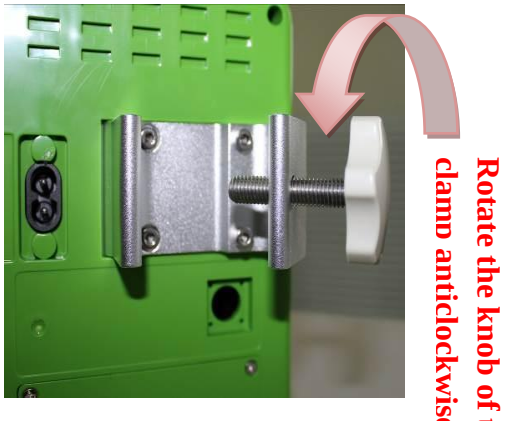



**Fig 1**


**Fig 2**

**Step 2: Connect to the Power**

Plug the power cord into the outlet of the infusion pump as shown in Fig 3.

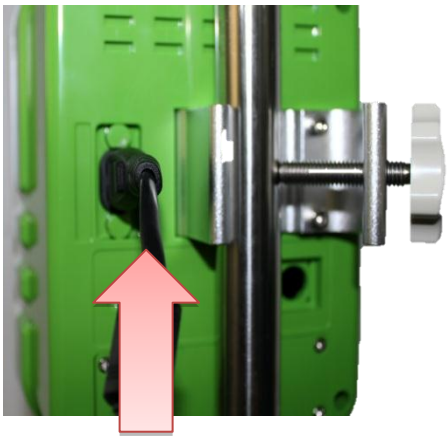


**Fig 3**

**Warnings:**

- **Place the machine in the horizontal position.**
- **The applicable power supply scope is 100V-240 V 50/60Hz.**
- **Only the AC power cord attached is available.**

**Step 3: Turn on the Power Supply**

As shown in Fig 4, press the  key for 3~5 seconds and then release it. The infusion pump will test itself. The LCD will show the software version and read the serial number. And then the infusion pump will be turned on and enter into the rate mode as shown in Fig 5.


Fig 4


The AC power symbol

Fig 5

**Notice:**

- **When the infusion pump is connected to the power supply and in the "on" status, the LCD displays the AC power symbol, which means the infusion pump is being charged.**

**Step 4: Install the IV set**

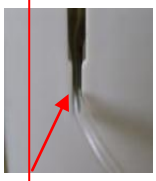
1) Pull out the door lock as shown in Fig 6.
2) Straighten the infusion pipe and put it into the Mounting Groove. Make sure it reaches the bottom as shown in Fig 7.
3) Put down the door lock gently by holding the top of it until it reaches back in place as shown in Fig 8. If the infusion pipe is properly installed, the green indicator light will be on. Otherwise reinstall it until the green light is on.

Pull out the door

Fig 6

Straighten the pipe

The infusion pipe should reach the bottom of the groove.



Right

Wrong

Fig 7

When the pipe is properly installed, the indicator light will be on.

Put down the door

Fig 8

⚠ **Warning: ● Make sure there is no bubble in the pipe.**

⚠ **Caution: ● Make sure the infusion pipe reaches the bottom of the groove.**

**Notice: ● The infusion pipe must be discarded after 24 hours of continuous use.**

**Step 5: Set the Infusion Modes and Parameters**

1) Press the STOP key to stop the infusion.
2) Press the SET key to select an infusion mode (the default mode is rate mode), and then press the ⇑ key or the⇓ key to select the parameter to be set as shown in Fig 9. Press the ENTER key to make the parameter value adjustable (when it turns yellow, it means it's adjustable), and then press the⇑ key or the⇓ key to adjust the value. After that, press the ENTER key to save the value.
3) For more details of parameters setting, please refer to 4.3

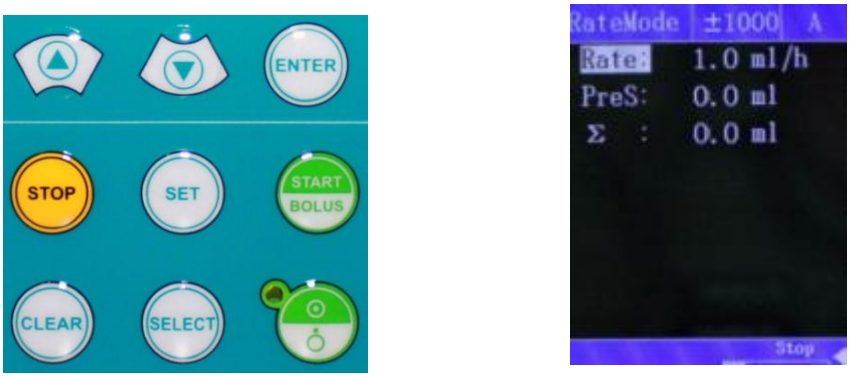


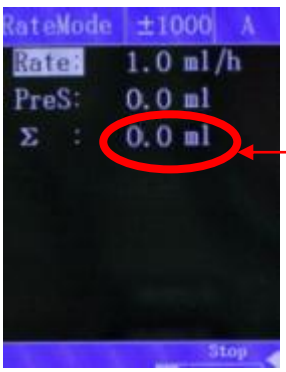

Fig 9

**Notice:** ● The accumulated volume is not adjustable.

**Step 6: Eliminate the Accumulated Volume**

Press the CLEAR key as shown in Fig 10. The accumulated volume will change into "0" as shown in Fig 11.


Fig 10




The accumulated volume changes into "0.0ml".

Fig 11

**Notice:**

● During the infusion process, the accumulated volume can only be observed. If you need to eliminate it, please stop the infusion first.

**Step 7: Start the Infusion**

After setting all the parameters and properly installing the infusion pipe, press the START key as shown in Fig 12 to start the infusion. The indicator light is flashing as shown in Fig 13. The motor begins to run, and the pump starts infusing.


Fig 12


Fig 13

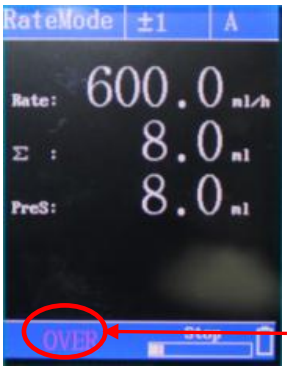
**Warning：** ● Make sure there is no air bubble in the infusion pipe. If there is any air bubble in the pipe, press the START key to eliminate them.

**Notice：** ● When the alarm gives out because of a serious battery shortage, the infusion pump will stop infusing automatically.

**Step 8: Infusion Completion**

When the accumulated volume reaches to the volume limit as shown in Fig 14, the LCD will display “OVER” and send out an audio-visual alarm to alert the user that

the infusion is finished. Press the Stop key to stop the alarm and the infusion as is shown in Fig 15.




"Over" alarm symbol

Fig 14


Fig 15

**Step 9: Turn Off the Power Supply**

Press the  key for 3-5 seconds and then release it to turn off the pump.

## 4.3 Start the “Bolus” Function

During the infusion process, if you need to accelerate the infusion when the current flow rate is under 1000ml/h, you can keep pressing the BOLUS key, the pump will infuse at the rate which has been already set (100-1000 ml/h available). After releasing the key, the pump will infuse at the original infusion rate.

**Notice：**

- When the flow rate >1000ml/h, the “BOLUS” function can’t be activated by pressing the BOLUS key.
- All the alarm functions will not be influenced when the “BOLUS” function is on.
- The default setting of the bolus rate is 1000ml/h**.**

## 4.4 Set the Infusion Mode and Parameters

**Parameter setting is under the "STOP" status.**

After turned on, the infusion pump will enter the rate mode by default as show in Fig16. If you want to use other infusion modes, please press the SET key to set the infusion mode. After pressing the SET key, the LCD will display in sequence the interface of the time mode (Fig 17), body weight mode (Fig 18) and the rate mode.

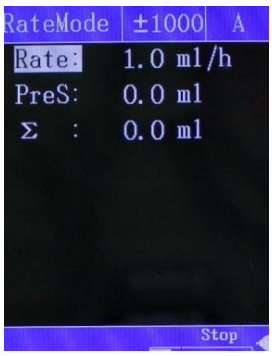



Fig 16

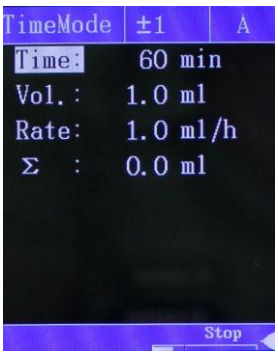



Fig 17

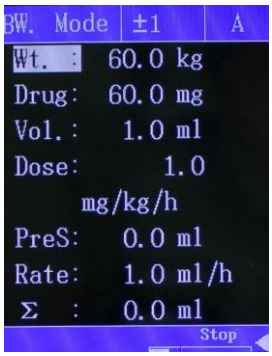



Fig 18

The parameters to be set vary with different modes as shown in Table 1.

Table 1

| Parameters to be set | | **Parameters range** |
|---|---|---|
| Rate Mode | Flow Rate | 0.1~2000.0ml/h |
| | Volume Limit | 0~9999.9ml |
| Time Mode | Time | 1~6000min |
| | Liquid Volume | 0.1~9999.9ml |
| Weight Mode | Weight | 0.1~300.0kg |
| | Drug | 0.1~999.9mg |
| | Liquid Volume | 0.1~999.9ml |
| | Dose | 0.1~9999.9 |
| | Dose Unit | mg/kg/h, ug/kg/min |
| | Volume Limit | 0~9999.9ml |

**Notice:** ● After turning off the pump, reset the parameters in Table 1 to the default value.

## 4.5 Basic Setting

**1) Infusion Rate Setting**

As shown in Fig 19, press the ENTER key to make the parameter value of "Rate" adjustable, it will be the interface as shown in Fig 20. Press the SELECT key to choose the unit of the value showing in the upper right of the screen corner, once pressing will lead to once change. The adjustable units are 0.1,1,10,100 and 1000. After selecting a proper unit of value change, you can press the ↑key or the ↓ key to adjust the flow rate by adding or reducing one unit of the value. The value of every adding or reducing is the value which is chose in the upper right of the screen corner. By repeating the operation users can set the value needed.

E.g. suppose the current flow rate is 100ml/h, and you need to set it to 1250ml/h.

---Press the SELECT key to choose 1000 as the unit of value change in the upper right of the screen corner, and then press the↑ key once to change the rate into 1100ml/h.

---Press the SELECT key again to choose 100 as the unit of the value change, and then press the↑ key once to change the rate into 1200ml/h.

---Press the SELECT key and choose 10 as the unit of the value change, and then press the↑ key 5 times to change the rate into 1250ml/h.

If there is a decimal fraction, press the SELECT key to change the unit of value into 0.1, and then press the ↑key or the ↓ key to adjust flow rate accordingly.


Fig 19

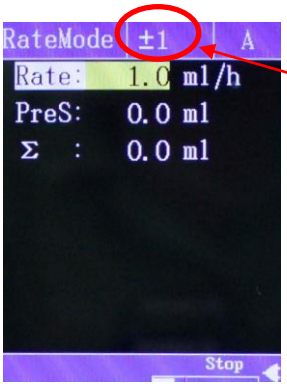



Fig 20

After pressing the SELECT key, the unit of value will vary from1000, 100,10,1 to 0.1 by turns.

**Cautions:**

● If the value to be changed is decimal, press the SELECT key to change the unit of value into 0.1.

● The value can be adjustable only after that it is selected and turns yellow, if it doesn't turn to yellow, it can only move the cursor when press the ↑key or the ↓ key.

● Formula in body weight mode:

Flow = Dose ×Body weight ×Volume/Drug（mg/kg/h）

Flow =60 ×Dose ×Body weight ×Volume/Drug ×1000（ug/kg/min）

●∑ stands for the accumulated volume during the infusion progress, which cannot be set. In the "STOP" status, press the CLEAR key to change the accumulation volume into "0".

**2) Preset the infusion volume**

As shown in Fig 21, in the "Stop" status, press the ⇓ key to select the parameter to be set; press the ENTER key to make the parameters value adjustable as shown in Fig 22, and then press the SELECT key, the ⇑ key or the ⇓ key to adjust the value. After that, press the ENTER key to save the value.

If the volume limit is not "0", when the accumulate volume reaches the volume limit, the infusion pump will stop the infusion, and the "OVER" alarm will be on. Press the STOP key to stop the alarm and return to the "Parameter Setting" interface. If you need to continue the infusion, please press the CLEAR key to eliminate the accumulated volume as shown in Fig 23.

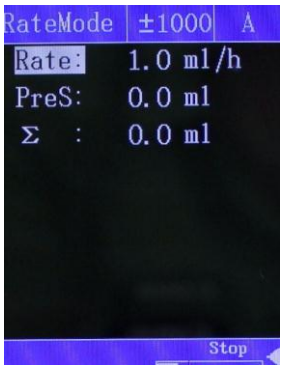



Fig 21

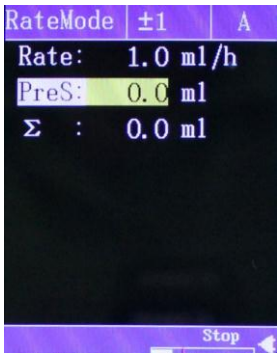



Fig 22

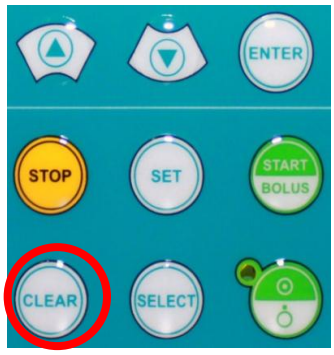



Fig 23

Notice： ● The preset infusion volume cannot be set in time mode.

## 4.6 Advanced Setting

1) In the STOP status, press the SELECT and the STOP at the same time to enter the "Advanced Setting" interface as is shown in Fig 24. Press the ↑key or the ↓ key to move the parameters. Press the ⇑ key or the ⇓ key or ENTER or SELECT to adjust the value. (Press the ENTER key to select the parameter, when it turns yellow, it becomes adjustable as shown in Fig 25.)

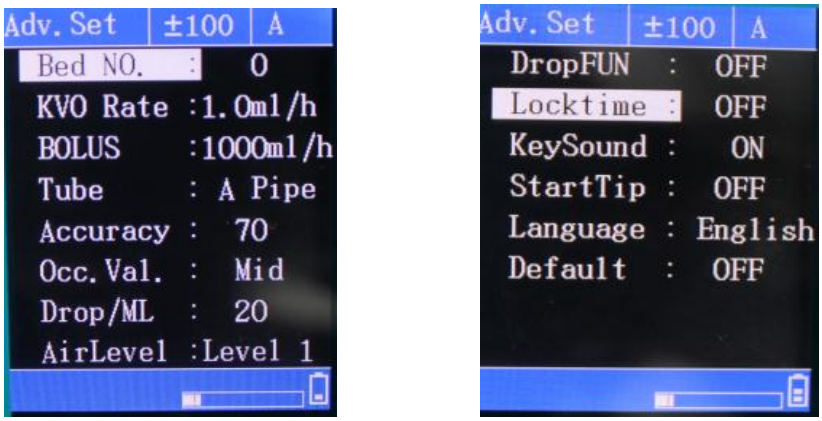



Fig 24

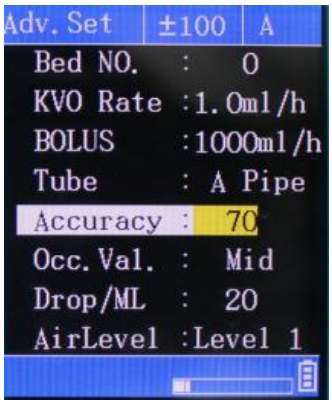



Fig 25

Specifications in advanced setting:

**Bed NO. :**

Together with wireless system to use, the setting range is 1-1000, while the factory setting is 0.

**KVO Rate:**

Used for setting the flow rate in KVO status, the range is 1.0~5.0ml/h. The factory setting is 1.0ml/h. It will be entered to KVO state automatically when occlusion alarm occurs in the infusion process. KVO flow rate is as same as the current settings.

**BOLUS:**

To accelerate the infusion, the range is 100—1000ml/h. The factory setting is 1000ml/h.

Press the BOLUS key to start BOLUS function. The flow rate is as same as the current settings.

**Tube Types:**

It can storage the parameters of three types of infusion pipes (Type A/ Type B/ Type C). The factory setting is Type A (the brand of "Dragon Heart"). After changing IV set, the accuracy value must be adjusted in order to keep the infusion accurate.

**Accuracy:**

Please reference to the part: 3) of Step 5 in Chapter 4.7. The range is 30-108.

**Occ. Val.:**

It is used for setting occlusion of the sensitivity (high, middle and low). When you choose "high", the pressure of alarm will be the biggest. It is difficult to trigger "occlusion alarm". The factory setting is medium.

**Drop/ ml：**

This parameter is necessary when the infusion pump uses the drop sensor. The range of the parameter is 1-100 drops/ml. The factory setting is 20drop/ml.

Change to rate mode from drop mode: in the "stop" status, press STOP and ENTER key together

**Air Levels:**

There are four air levels（shut, I, II, III）, when the flow rate is lower than 60ml/h, then the level of Bubble filter function is started. The higher the level you choose, the bigger the bubble can get through. The factory setting is "I".

**Drop FUN：**

This parameter only can be used to the equipment with drops sensor. The default setting of the pump with drops sensor is “ON”, while the one without drop sensor is “OFF”.

Notice: This function is only applicable to the infusion pumps, which are with drops sensor.

**Lock Time：**

When there isn’t any operation within the setting time, the pump will lock itself automatically. And the pump can be operated again only after the relevant operation. Users can set it according to different requirements. The default setting is “OFF”.

Notice: The pump will lock itself automatically after the parameters setting. Press the ↑ key and ENTER key at the same time to unlock it.

**Key Sound：**

The parameter is about the sound when pressing the keys. Users can set it “ON” or “OFF” according to different requirements. The default setting is “OFF”.

**Start Tip:**

If the START key is not pressed to start the pump after the parameters setting, the reminding tone will give out automatically. Users can set it according to different requirements. The default setting is “OFF”.

**Language：**

Languages are available (Chinese and English). The default setting is “English”.

**Default:**

The parameter is set to get it back to the default setting.

After setting these parameters, press the SELECT key and the STOP key together again to return to the “Advanced Setting” interface.

## 4.7 Define the IV Set Brand

We test and set the parameters with the infusion pipe of the brand "Dragon Heart". If you need to use infusion pipes of other brands, please reset the parameters in the following steps:

**Step 1: Prepare an infusion pipe of the new brand.**

**Step 2: Turn off the infusion pump.**

**Step 3: Install the infusion pipe according to the normal operational procedures. For the way of installing the infusion pipe, please refer to the Step 4 of "4.2 Basic Operation Steps"**

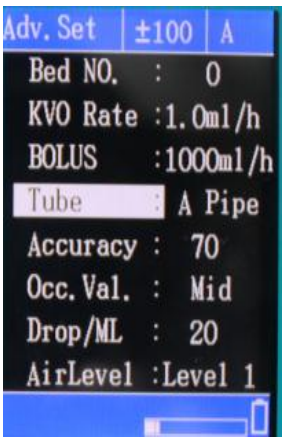
**Step 4: Turn on the pump.**

**Step 5: Set the parameters of the new infusion pipe.**

1) Choose the Infusion Pipe.

Model: BD-8000 infusion pump can save the parameters of three types infusion pipes. Press the SELECT key and the STOP key together in the "STOP" status as shown in Fig 26 to enter the "Advanced Setting" interfaces as shown in Fig 27. In this interface, you can choose the corresponding infusion pipe: Type A, Type B or Type C.


Fig 26



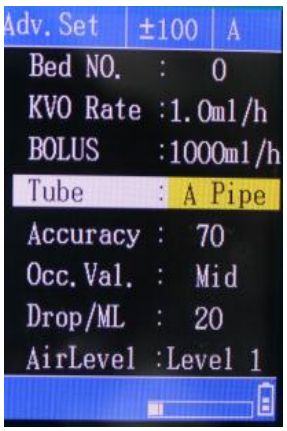
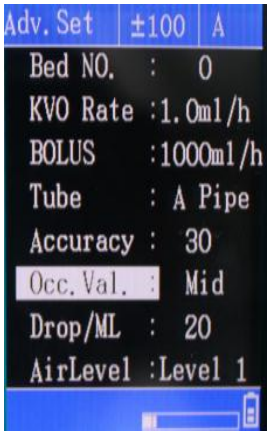




Fig 27

2) Set the Occlusion Alarm Value

There are three levels of the occlusion alarm value: high, middle and low as shown in Fig 28. Set the occlusion value according to the requirements. The steps are just as the

ones to choose the infusion pipe.



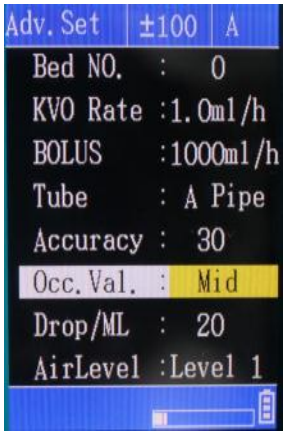
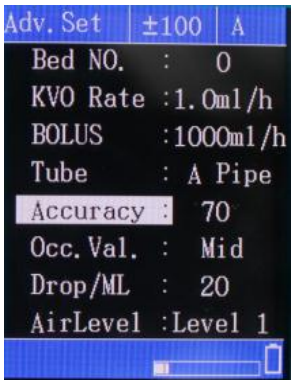




Fig 28

3) Adjust the Accuracy

- In the interface of "Rate Mode", set the infusion rate to 150ml/h, and the volume limit to 20ml. Start the infusion after installing the new brand of infusion pipe properly, and measure the liquid volume flowed from the infusion pipe with a measuring cup.
- If the liquid flowed into the measuring cup in Step 1 is 1ml more than 20ml, then add 3 to the accuracy value. If the liquid flowed into the measuring cup is 1ml less than 20ml, then reduce 3 from the accuracy value. If the liquid flowed into the measuring cup is the same as the volume limit 20ml, then there is no need to adjust the accuracy. Press the ↑ key or the ↓ key to select the parameter of "Accuracy" as shown in Fig 29. Press the ENTER key to make the accuracy value adjustable, and then press the ↑ key or the ↓ key to set a suitable accuracy value. Finally, press the ENTER key to save the value.



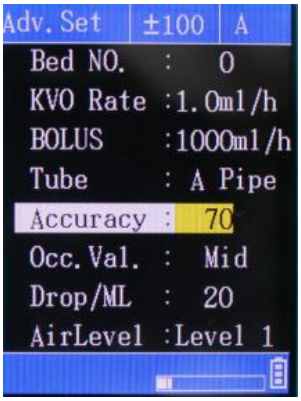




Fig 29

Example 1: The volume limit is 20ml, and the actual volume of the liquid flown into the measuring cup is 21ml, which is 1ml more than the volume limit. As the

original accuracy value is 75, so you need to change the accuracy value into 78. Then press the ENTER key to save the value.

Example 2: The volume limit is 20ml, and the actual volume of the liquid flown into the measuring cup is 18ml, which is 2 ml less than the volume limit. As the original accuracy value is 75, so you need to change the accuracy value into 69.

- Repeat step 1 and step 2 until the accuracy value is accurate. That means the volume of the liquid flowed into the measuring cup is the same as the volume limit.

**Notice:**

- The accuracy of the infusion pump is ±5%.
- In order to reduce the error of the accuracy test, the infusion tube should be filled with liquid and without bubbles before the test.

## 4.8 Battery Charge

1) After the pump is connected to the AC power, the LCD will display an AC power symbol, and it begins to be charged automatically. Press the ⇑ key and the ⇓ key together at this time, the LCD will display the battery capacity as shown in Fig 30. When the battery is fully charged, the battery capacity is 8.2, and the battery will stop being charged automatically. When the battery capacity is below 8.2, the battery will begin to be charged automatically.

2) When the power cord is disconnected, a battery supply symbol will be displayed on the pump, which means the pump is supplied by battery and the checks stand for the capacity of battery. When the battery is used up, the pump will send out an alarm sound to alert the user that the battery power is low and needs to be recharged.

**Warning:**

**● The battery only can be recharged in the condition that the pump is "ON".**

**Notice:**

**● It takes 8-14 hours to charge the battery fully after it is used up.**

**●Batteries belong to expendables. Replace them when they are used up.**

**●If the pump haven't been used for a long time, please charge and discharge the battery every three months to avoid battery damage.**

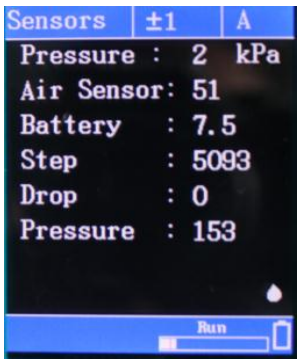



Fig 30

# Chapter 5 Alarms and Solutions

| Description | Reasons | Solutions |
|---|---|---|
| OVER | The accumulated volume reaches to the volume limit | Press the STOP key to stop the infusion and the alarm. Then press the CLEAR key to eliminate the accumulated volume. After that, press the START key to start the infusion. |
| Air Bubble | Air bubbles in the pipe | Press the STOP key to stop the infusion and the alarm. Eliminate the air bubbles in the pipe, and then press the START key to restart the infusion. |
| | Improper installation of the Infusion pipe | Reinstall the infusion pipe properly. |
| | Something wrong with the infrared sensor | Contact the manufacturer or agent to repair. |
| OCCLUSION | Infusion loop occlusion | Press the STOP key to stop the infusion and eliminate the alarm. Press the START key to restart the infusion after eliminating the occlusion in the loop. |
| | The occlusion sensitivity is much too high. | Refer to this instruction manual to set the occlusion alarm value. |
| | Something wrong with the sensor. | Contact the manufacturer or agent to repair. |
| Low Battery | The battery is too low | Connect to the AC power supply to charge the battery. |
| | Battery aging or something wrong with the battery charge circuit. | Contact the manufacturer or agent to repair. |
| AC Power Supply | No AC power supply. | Check if the power cord is connected properly. |
| | Something wrong with the power supply circuit of the infusion pump. | Contact the manufacturer or agent to repair. |

| | | |
|---|---|---|
| Installation Errors | Incorrect installation | Reinstall the infusion pipe properly. |
| | Something wrong with the sensor of the infusion pump. | Contact the manufacturer or our agent to repair. |
| Abnormal 1 | Data communication error. | Contact the manufacturer for inspection and maintenance. |
| Abnormal 2 | Malfunction in the motor of the infusion pump. | Press the STOP key to stop the infusion and eliminate the alarm, and then press the START key to restart the infusion. |
| | | Contact manufacturer for inspection and maintenance if such alarm occurs again. |

# Chapter 6 Products Maintenance

## 6.1 Cleaning and Disinfection

Please clean the infusion pump regularly. Increase the cleaning time when it's suffering from sand blown by wind or serious pollution. Please learn the cleaning regulations of medical equipment before cleaning.

Cleaning the infusion pump:

1. Make sure the pump is off and disconnected from the AC power supply before cleaning.
2. Use a piece of soft cloth drenched by warm water to clean the infusion pump.
3. Use a tampon moistened with 75% alcohol to wipe the outer shell of the machine for disinfection.
4. Keep the room ventilated after disinfection or cleaning
5. Do not use something like xylene, acetone or anything analogous to clean the pump. Otherwise, these chemicals will cause damage to the outer shell.

## 6.2 Routine Maintenance

## 6.2.1 Check the infusion flow rate

Use the measuring cup and stopwatch to test the injection flow rate every six months.

## 6.2.2 Maintain the battery performance

**1. Optimize the battery performance**

Please optimize the battery when it is firstly used. A complete period of optimizing is: Firstly, charge the battery up to full. Then run out of the battery power. At last, recharge the battery up to full again.

To ensure the performance of the battery and prolong its life, please optimize the battery regularly.

**Caution：**

- As time went on and the battery keep being used, the actual storage capacity of the battery will decrease. If the power supply time of the battery reduces obviously, please replace it with a new one.

**2. Check the battery performance**

As time went on, the performance of the battery will decrease.

Please check the battery performance regularly.

Check the battery in the following ways:

1. Connect to AC power for over 8~14 hours for recharging.
2. Keep the pump operating continuously until it turns off due to low battery.
   - If the infusion pump takes 90 minutes or even longer from start to shutdown, the battery is in good condition.
   - If the infusion pump takes 45～90 minutes from start to shutdown, the battery life is close to its life end.
   - If the infusion pump takes less than 45 minutes from start infusion to shutdown, the battery life is at its end and you are required to replace the battery.
3. After battery inspection, recharge the battery again for the next use.

**Cautions：**

- If the power supply time is too short after recharging fully, the battery might have faults or have been damaged. The supply time of the battery depends on the configuration and its frequency of use, such as, long time use of back light.
- If there is obvious damage (bulge, deformation and leakage), or the battery cannot store the capacity, please change it and recycle it in a correct way.

**3. Recycling**

If there is obvious damage (bulge, deformation and leakage), or the battery cannot store the capacity, please change it and recycle it in a correct way.

## 6.2.3 Routine Maintenance

| Interval | Routine Maintenance Procedures |
|---|---|
| According to the hospital policy | Thoroughly clean the infusion pump shell before or after long period of storage. |
| Give a check to the pump at least once a year. | 1. Check the AC power plug and cord.<br>2. Run the machine until it gives a low battery alarm. Then charge the battery to ensure the normal operation and charging. |

## 6.2.4 Pollution-Free Treatment and Recycling

The unit must be fully calibrated by as service engineers approved by the manufacturer after 3 years' use. Please refer to the part: 3) of Step 5 in Chapter 4.7 for calibration procedures.

The service life of this product is 3 years. Machine exceeding its service life should be discarded.

Please contact the manufacturer or distributor for more relevant information.

1. Model: BD-8000 infusion pumps that are no longer in use could be sent back to their distributor or manufacturer for proper recycling.
2. Used-up lithium polymer batteries could be delivered to its distributor or manufacturer for disposition, or dealt with according to the applicable laws and regulations.

## 6.3 Storage

Ambient temperature -20~55℃, air pressure 50~106kPa, relative humidity≤95%

# Chapter 7 Electromagnetic Compatibility and Interference

This pump is designed to prevent external interference, including high-intensity radio frequency radiation, magnetic field and electrostatic. But users are advised not to use mobile phone within 0.5 meters away from the machine.

This pump is quite low in electromagnetic frequency, which will not interfere with the surrounding electronic equipments. But this pump shall produce certain amount of electromagnetic radiation, which is in compliance with IEC/EN 60601-1-2 and IEC/EN60601-2-24 standard. If interference occurs when this pump is used with other equipments, certain measures need to be taken to reduce this interaction, such as proper relocation of the two kinds of machines that cause mutual interference.

Avoid using this system in combination with electro tomes or similar devices. Otherwise the electromagnetic interference will cause mechanical failure or system collapse.

When using this infusion pump, avoid using such equipments which produce electromagnetic field as mobile phones close to it. Otherwise the electromagnetic interference will cause mechanical failure or machine collapse.

# Chapter 8 Product Specifications

## 8.1 Specification Table

| | |
|---|---|
| Product Name | Infusion Pump |
| Product Model | Model: BD-8000 |
| Infusion Pump Mechanism | Peristaltic Mechanism |
| Flow Rate Range | 1~2000 ml/h |
| Bolus Rate | 100-1000 ml/h |
| Infusion Increment | 0.1 |
| Water-proof Classification | IP21 |
| Infusion Mode | 1. Rate Mode;<br>2. Time Mode;<br>3. Body Weight Mode; |
| Rate Mode | Rate: 1~2000 ml/h |
| Time Mode | 1. Time: 1minute~2000minutes<br>2. Vol.: 0.1ml~9999.9 ml |
| Body Weight Mode | 1. Body Weight: 0.1kg~300.0 kg<br>2. Drug: 0.1mg~999.9 mg<br>3. Volume:0.1~999.9 ml<br>4. Dose: 0.1~9999.9 (The maximum value is restricted to body weight, drug, volume, dose and unit)<br>5. Dose Unit : mg/kg/h or ug/kg/min |
| KVO Rate | Adjustable Range: 1ml/h~5.0 ml/h (The pump will infuse at the KVO rate when there is an occlusion alarm) |
| Preset Volume Range | 0.1~9999.9 ml |
| Preset Time Range | 0~99 hours 59 minutes |
| Accumulated Infusion Volume Displayed | 0.1~9999.9 ml |
| Infusion Accuracy | ±5% |
| Power Supply | AC100V-240V, allowable error ±10%, 50/60Hz or D.C. 7.4v, relative error +5%, -10% (rechargeable lithium battery, 1600mAh) |

| | |
|---|---|
| Maximum Power Consumption | Max25VA, running more than 2 hours at the rate of 25ml/h after being fully recharged. |
| Battery Charge | When infusion pump is connected to AC power, turn on the Power and the battery will start charging automatically (about 8-14 hours to charge fully). |
| Fuses | Double 250V 2A |
| Displayed Information | Flow rate, preset volume, accumulated volume, battery capacity, AC power symbol, infusion completion, occlusion, air bubbles, bed No. and pressure value etc. |
| Status Indication Information | Stop, Run, Bolus, KVO |
| Alarm Information | Over, occlusion, air bubbles, low pressure, installation error of infusion pipe, abnormal 1, abnormal 2, drops error and serious low battery. |
| Air Bubble Detection | At the rate of 600ml/h, the smallest bubbles that can be detected are 0.005ml of volume. |
| Infusion Pressure | Maximum pressure is 300kPa, occlusion gate value is 39.2kPa~137.2kPa.<br>The longest time to give occlusion alarm is 2 minutes at rate of 25ml/h. And at rate of 5ml/h is 5 minutes. |
| Maximum Size of Outer Shell | 125mm×140mm×205mm (length ×width ×height) |
| Maximum Weight | <3.0 kg |
| Classification | Class Ⅱ, Type BF |
| Work Mode | Continuous running |
| Outer Shell Material | ABS Plastic |
| Operating Conditions | Environment temperature: +5℃~+40℃;<br>Air pressure: (860~1060) kPa;<br>Relative humidity :20%~80% |
| Storage Conditions | Environment temperature: -20℃~+50℃;<br>Air pressure:(50~106) kPa;<br>Relative humidity ≤95%;<br>Non-corrosive gas and well-ventilated room. |
| Applicable Infusion Pipes | National standard infusion pipes |

| | |
|---|---|
| Applied Standard | GB/T191-2008<br>GB8368-2005<br>GB9706.1-2007<br>GB 9706.27-2005<br>GB9969.1<br>GB/T14710-1993<br>YY0466-2003 |

## 8.2 Occlusion Pressure, Maximum Alarm Time and BOLUS Volumes

| Standard occlusion pressure (Kpa) | Flow Rate (ml/h) | Pressure Value (Kpa) | Alarm Time (Min) | BOLUS volumes (ml) |
|---|---|---|---|---|
| 40 | 5ml | 40.80±10 | 00:03:44 | 0.29 |
| | 100ml | 43.47±10 | 00:00:10 | 0.17 |
| | 500ml | 44.93±10 | 00:00:03 | 0.25 |
| 100 | 5ml | 101.33±20 | 00:05:14 | 0.43 |
| | 100ml | 102.27±20 | 00:00:16 | 0.27 |
| | 500ml | 107.2±20 | 00:00:06 | 0.50 |
| 160 | 5ml | 161.20±30 | 00:08:38 | 0.70 |
| | 100ml | 162.27±30 | 00:00:24 | 0.40 |
| | 500ml | 163.8±30 | 00:00:07 | 0.58 |
| | 100ml | 162.27±30 | 00:00:24 | 0.40 |
| | 500ml | 163.8±30 | 00:00:07 | 0.58 |

The above data is concluded

1) by using “Dragon Heart” brand IV sets
2) with FLUKE IDA4PLUS Tester.

**Caution：**

- The default standard occlusion pressure of the infusion pump is 100KPA.
- The standard occlusion pressure range of the infusion pump is 40~160KPA.

## 8.3 Infusion Accuracy Diagram

Following is the infusion accuracy diagram which shows the feature after the infusion starts and the infusion changes after it under normal infusion.

**Cautions：**

● The infusion accuracy cannot reflect the clinical standard, such as the patient's age, weight and the drug using.

● The infusion accuracy can be influenced by the environment (pressure, temperature, humidity and the infusion accessories and so on).

### 8.3.1 Start-up Curve

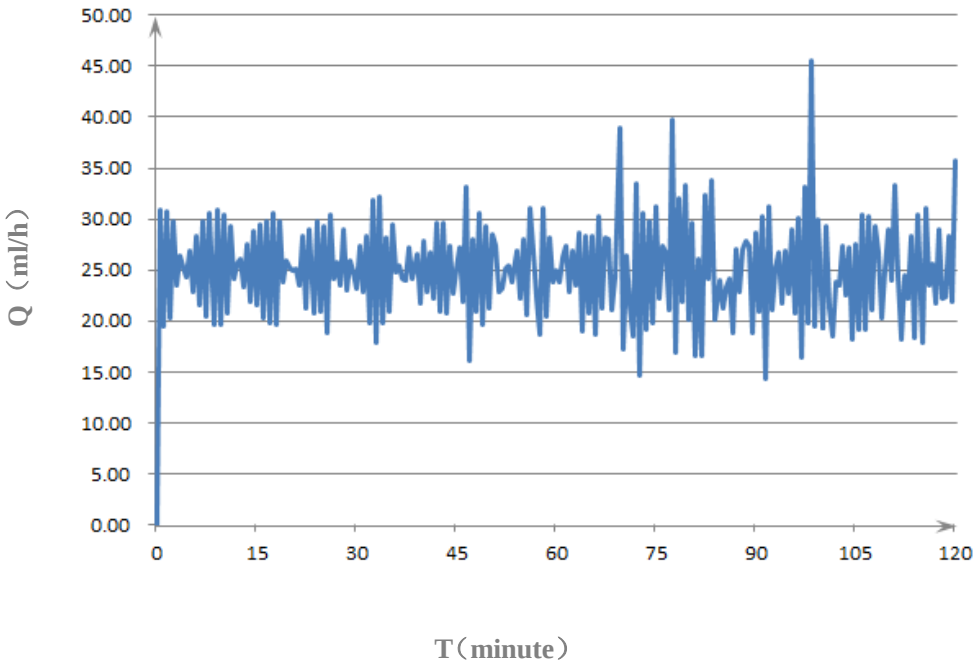
Made according to the collection of 2 hours' test period

Sampling rate: 25ml/h

Sampling interval: Δt =0.5 minutes

Test cycle:  T=120 minutes

Infusion rate: Q（m/h）



## 8.3.2 Horn-shaped Curve

Short period infusion rate deviation（pΔt）

Sampling infusion rate: 25ml/h

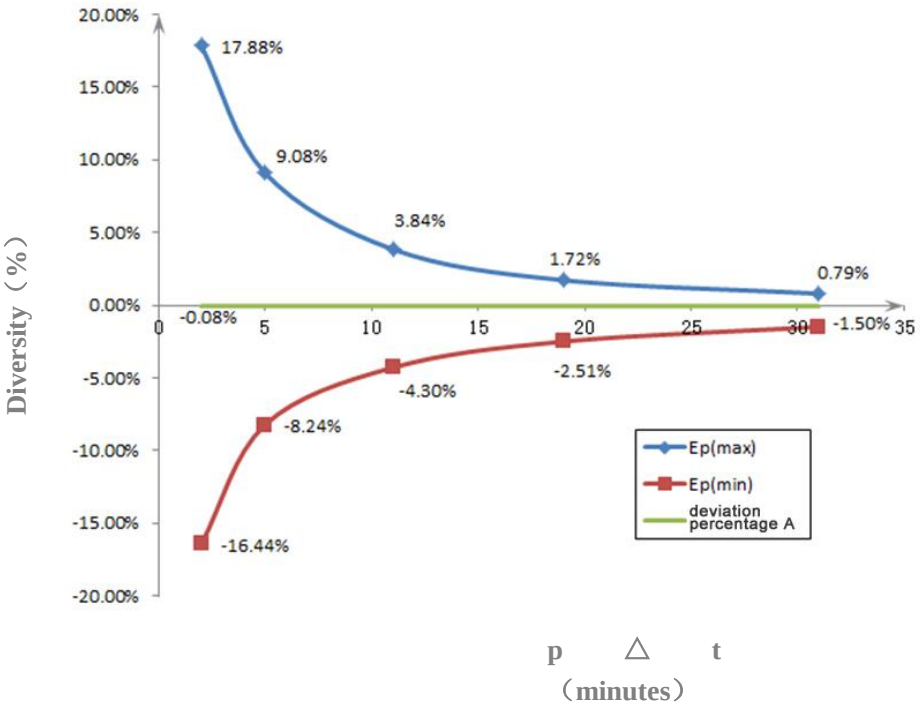
Sampling interval: Δt =0.5minutes

Observation lasting: pΔt =2, 5, 11, 19 and 31 minutes

Maximum deviation at certain lasing time: EPmax (%)

Minimum deviation at certain lasing time: EPmin (%)

Average deviation percentage : A（%）



# Chapter 9 Recommended Infusion Accessories

We test the infusion pump and set the parameters with the infusion pipes with the brand of “Dragon Heart”. If you need to use infusion pipes with other brands which are complied with the national standard, please reset the parameters and adjust the accuracy as per this instruction manual.

The connection may be slack if you use pipes that are equipped with the sliding connector.

# Chapter 10 Maintenance Services

The warranty period is 1 year from the purchase date. We can offer free repair service within the warranty period on condition that the product is operated properly. The following situations are not within the range of free maintenance and repair:

1. Malfunction caused by false use, repair or reconstruction by any unprofessional, unqualified or untrained people.
2. Malfunction or damage caused during transportation.
3. Malfunction or damage caused by fire, salt, poisonous gas, earthquake, hurricane, flood, abnormal voltage and other nature factors.

We can provide circuit or parts lists required to the authorized service personnel.

After-sale Service Point: Shenzhen Kang Brand Meditech Co., Ltd.
After-sale Service Address: Floor 5A, Blk. A, Tempus Building, Qingshuihe 1st Street, Luohu District, Shenzhen, China
Post code: 518023
Tel: +86 755 22218824
Fax: +86 755 22271900