

LT4810 Infusion Pump Operator's Manual



Please read the manual before using the product!
Please keep the manual close for easy reference!

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I. Product Introduction

1.1 Product Component and Application

The LT4810 is made up of the main system unit, inner rechargeable battery, and a back side clip. It is used in hospitals and clinics where patients need to be given steady and continuous intravenous infusion or precise medication.

1.2 System Structure

The LT4810 Infusion Pump contains the following components:

1. **The Microcomputer:** This is the “brain” of the pump, having intellectualized control and management over the entire system, it processes the detected signals. It uses two Single-Chip Mickey (SCM) Systems for mutual backup copying and supervision. When something is wrong with one SCM, the other one will send out an alarm and cut the power of the host computer, which will then stop running completely to ensure patient safety.
2. **The Pump Device:** This is the “heart” of the pump and the main driving force of the infusion unit. It drives the peristaltic pump with stepper motor.
3. **The Inspection Devices:** These include the Ultrasonic sensor which

detects air bubbles in the infusion tube, the Pressure sensor which detects the pressure of the infusion tube, and the Hall sensor which monitors the motor control. These sensors will send signals to the central computer of the pump and receive instructions from the central computer on how to proceed if there are problems.

4. **The Alarm Device:** After the signal sent by the sensor is processed by the microcomputer, an alarm signal will be elicited to alert the user. There are two main types of alarms: photoelectric alarm (LBD) and audible alarm (loudspeaker and buzzer).
5. **The Input and Display Panel:** The input panel is what the user will use to set various infusion parameters, such as infusion volume and infusion rate, etc. The display panel is where various parameters are displayed and shows the current operation progress on a color LCD screen.
6. **The Inner Rechargeable Battery Component:** This component supply electric energy for the infusion pump when AC Power is unavailable.

II. Safety Precaution

2.1 Warning

- The device must be operated by professional medical staff, such as doctors,

nurses and medical technicians, etc.

- During the infusion process, keep watch on the amount of liquid remaining in the infusion bag or infusion bottle. Don't rely solely on the alarm functions of the infusion pump.
- Avoid using this pump in combination with MRI (Nuclear Magnetic Resonance Image) or medical equipments analogous to this instrument; otherwise the electromagnetic interference will cause a system failure or system collapse.
- When using this pump, do not use equipments nearby which produce electromagnetic fields such as a mobile phone. Otherwise the electromagnetic interference will cause a system failure or system collapse.
- Avoid using this infusion pump in a flammable atmosphere.
- In high pressure atmospheres, the occlusion inspection may not work correctly.
- Before starting infusion, making sure the blood vessels have been protected.
- In the infusion line, occlusion caused by a tube knot and filter coagulation or intubation would cause a rise to the inner pressure of the infusion tube. When trying to get rid of the cause of the occlusion, proper measures should be taken to prevent too much liquid from being injected into the patient's body. For example, before eliminating the cause of the occlusion, squeeze the infusion tube shut.
- Use the infusion pump 120 cm above or below the patient's heart.
- Avoid using the infusion pump when there are alarms.
- If the infusion pump is used in conjunction with other infusion accessories, such as a fluid warmer, or if one IV set is installed on two different pumps, the accuracy of the pump may be affected.
- Avoid repeatedly using disposable infusion components or repeatedly sterilizing the used components. Once the components have been used,

dispose of them in accordance with their instructions and the laws of the territory.

- Only the components, connectors and disposable products which comply with National Standards can be used for infusion in the pump. Please consult the distributor who sold the product to you regarding these items if you have questions.

2.2 Attention

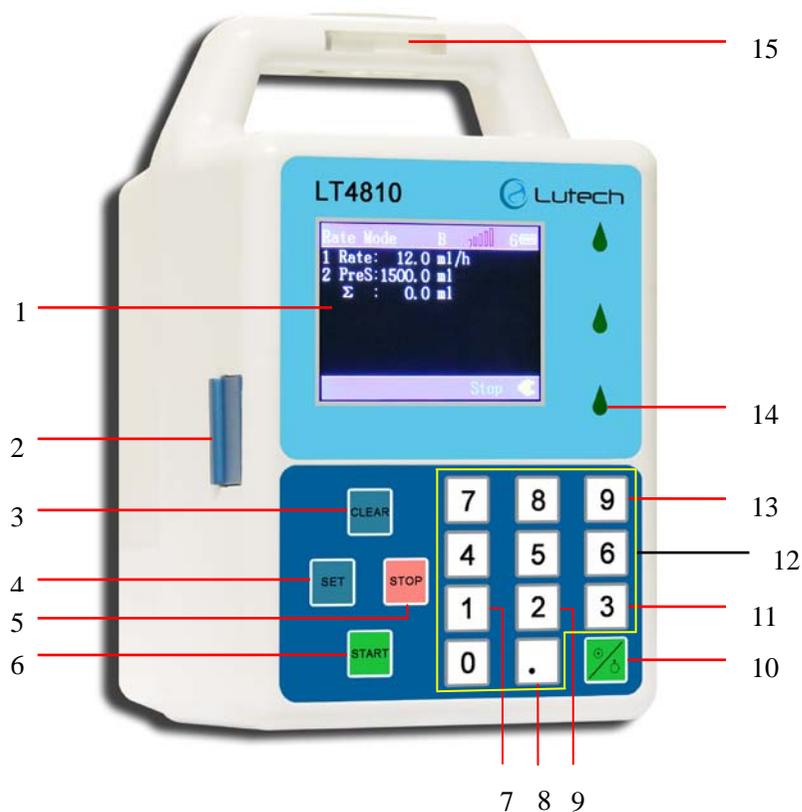
- When infusion lasts over 24 hours, a new IV set should replace the used one.
- Please use only your fingers to press the buttons on the input panel. Sharp tools will damage the surface of the panel.
- Avoid using the pump in direct sun light and in areas of abnormally high temperature or humidity.
- Use a piece of soft cloth and wet it with warm water to wipe down the surface of the infusion pump if any liquid drops onto it.
- Avoid autoclaving the infusion pump or exposing it to chemical substances.
- Before using the battery, make certain the battery has sufficient power. When necessary, recharge the battery.
- When using AC power, use the power cord included in the packing carton.
- If the infusion pump does not work according to the operator's manual, and the cause is not clear, stop the infusion pump and report the error (including the information on the infusion components, infusion amount, infusion rate, machine No., the type of infused liquid, etc.) to the distributor or manufacturer who sold the product to you.
- If an error occurs, the self-diagnosing function of the pump will stop the infusion process and send out an alarm.
- If the infusion IV set in use has not been calibrated, the accuracy of it

cannot be maintained. The biggest error could reach 40% or higher.

- Please watch your fingers as you close the door of the infusion pump as the door is spring loaded and may close quickly.
- The ID No. of the pump was set in the factory. Please do not change this number.

III. External Features

3.1 Front Panel



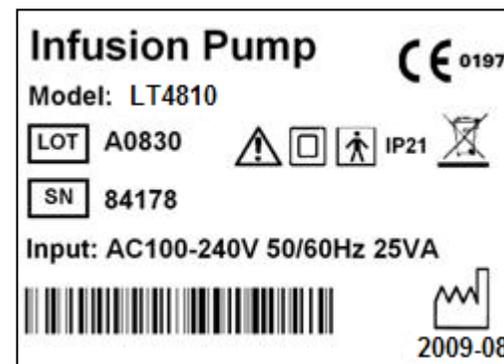
No.	Description	Function
1	LCD	Displays infusion information.
2	Door Latch	Flip door latch towards the front of the pump to open the door.
3	CLEAR key	1. Clears accumulated volume to 0 in the infusion mode setting interface. 2. Clears the parameter value when setting parameters.
4	SET key	1. While in any of the infusion mode setting interfaces, press the Set key to save the newly changed values. 2. While in any infusion mode setting interfaces (but not in any parameter setting mode), press the Set key to return to the main menu interface. 3. While in the sensors parameter interface, press the Set key to return to the infusion mode setting interface.
5	STOP / Silence Alarm key	1. When infusion is in progress, press the Stop key to stop infusion. 2. When the alarm sounds, press the Stop key to silence the alarm. (Note: there are three alarms that cannot be silenced: Low Voltage Alarm, Low Battery Alarm, and Battery Usage Alarm.) 3. While in any infusion mode setting interfaces and while changing a parameter, press the Stop key to cancel what you are doing and return the value to what was there before. At the same time, it will take you out of the parameter change menu. 4. In the sensor parameter interface, press the Stop key to return to infusion mode setting interface.

6	START/BOLUS key	<ol style="list-style-type: none"> 1. When infusion is not in progress and the pump is ready, press the Start key to start infusion. 2. Press and hold the Start key during infusion to activate the bolus function. (The maximum Bolus rate is 1000ml/h. If your infusion rate is over this amount, Bolus will not have any affect.) Let go of the start key to stop the bolus function and return to the original infusion rate.
7	Numerical key 1	While in the main menu, press the numerical key #1 to enter into Rate Mode.
8	Decimal key	The Decimal key is used to enter fractions into parameters and settings.
9	Numerical key 2	While in the main menu, press numerical key #2 to enter into Time Mode
10	POWER key	<ol style="list-style-type: none"> 1. If the pump is off, press and hold the Power key for 3-5 seconds to turn on the pump. 2. If the pump is on, press and hold the Power key for 3-5 seconds to turn off the pump.
11	Numerical key 3	While in the main menu, press numerical key #3 to enter into Body Weight Mode.
12	Numerical Keys	Use the Numerical Keys to enter new values for the parameters and choose the parameters to change.
13	Numerical key 9	<ol style="list-style-type: none"> 1. While in any infusion mode setting interface, press numerical key #9 to enter the sensor parameter interface. 2. In the sensor parameter interface, press numerical key #9, Stop key, or Set key to return to the mode setting interface.
14	Infusion Indicator Light	The infusion indicator lights flash alternately from top to bottom during infusion.

15	Operation Indicator Light	<ol style="list-style-type: none"> 1. When there is an alarm, the operation indicator light flashes red. 2. When there is no alarm, and if the installation of the IV set is correct, the operation indicator light will be on in a green color. 3. When there is no IV set installed or the installation of IV set is incorrect, the operation indicator light will be off. 4. When the pump is off but is still connected to AC Power, the operation indicator light will be on in an orange color.
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3.2 Packaging

1. The product label is pasted on the back of the pump. Your product label may differ from the picture below depending on the pump type and version you have ordered.



2. Label Marks and Meaning:

Mark	Description
	Production Batch No.
	Serial No.
	Attention! Check the Instruction Manual!
	Class II equipment
	Type BF applied part
IP21	Keep equipment away from water
	Pollution-free Treatment
	Date of Production
	Device complies with the requirements of the EC Directive 93/42/EEC. Registered with the CE Mark

3. Packing List:

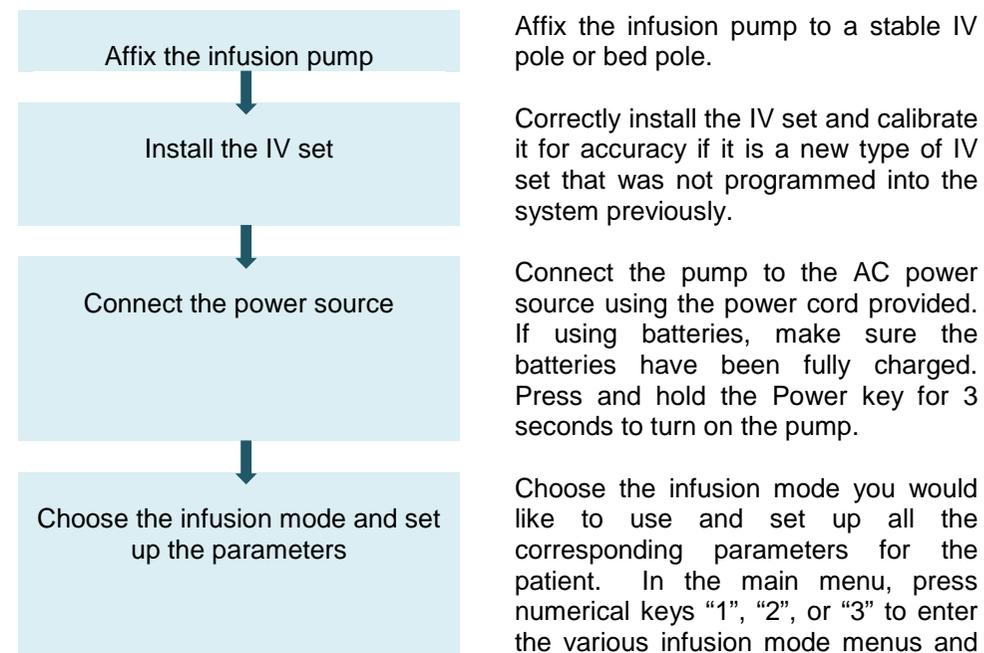
Item	Quantity
Infusion pump LT4810	1
AC power cord	1
Operator's manual	1
Certificate of approval	1

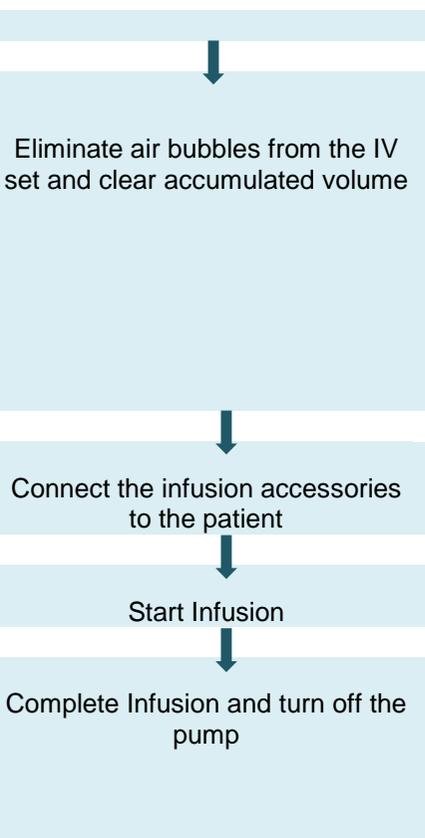
Maintenance card	1
IV set	1

Note: If anything is missing from the packing list above, please contact your distributor within 5 days of receiving the product. Otherwise, the order is considered fully fulfilled and no replacements or credits will be provided.

IV. Operating Instructions

4.1 Operation Flow Chart





input new values.

DO NOT attach the infusion accessories to the patient yet. Before starting infusion, press the Start key to run the infusion process, allowing the elimination of air bubbles from the IV set. Once all air bubbles are eliminated, press the Stop key. Then press the Clear key to clear the infusion volume and other relevant data. Now you are ready to use the pump on the patient.

Connect the infusion accessories to the patient.

Press the Start key to start infusion.

Once infusion is complete, an alarm will sound. Press the Stop key to silence the alarm. If the pump is no longer required, press and hold the Power key for 3 seconds to turn off the pump.

infusion pump onto the IV pole.

Note: Always place the pump in a vertical position.

Note: Always check the stability of the IV pole or bed pole first before affixing the infusion pump onto it.

Step 2: Install the IV set

1. Open the pump door



Attention:
The door is spring loaded. It will spring back to the closed position once it arcs back below 90 degrees of the pump. So please keep your fingers away from the space between the door and the pump to avoid having your fingers caught in the door.

2. Open the anti-free flow clip



3. Install the IV set (Please see Section 4.4 for detailed instructions on setting the parameters for a new type of IV set).

4.2 Detailed Operation Steps

Step 1: Affix the infusion pump

1. Rotate the knob of the pole clamp counterclockwise until you have enough room to put it through the IV pole.
2. Rotate the knob of pole clamp clockwise to tighten it and affix the



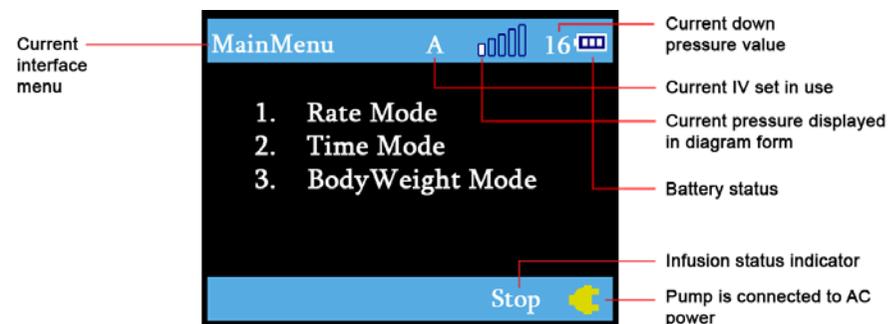
Step 3: Connect to the power source

Connect the power cord securely to the infusion pump and then plug it into an AC outlet.

Note: Applicable voltage range is AC100V~240V, 50Hz/60Hz.

Step 4: Choose the infusion mode and set up the parameters

1. When the pump is first turned on, it will take you to the Main Menu. On the Main Menu, you have a selection of three different infusion modes.

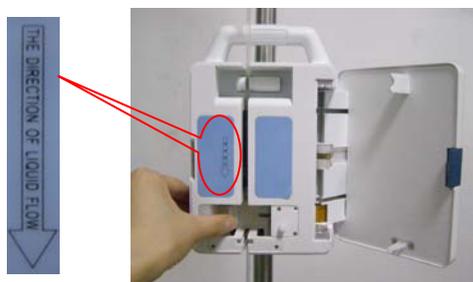


2. Choose the infusion mode you wish to use.
 - a. Press numerical key #1 to select **Rate Mode**



Attention:
The infusion tube must reach the bottom of the groove. If the IV set is put in place correctly, the Operation Indicator Light on the handle of the infusion pump will light up in a green color.

4. Close anti-free flow clip



5. Close the pump door.



Attention:
Please make sure the door is closed tightly, otherwise the alarm will sound and infusion cannot be started.

Required Parameters		Parameters Range
Rate mode	Flow rate	1.0~2000.0ml/h
	VTBI	0.0~9999.9ml
Time mode	Time	1~2000min
	VTBI	1.0~9999.9ml
b. P r Body Weight mode s s	Weight	0.1~300.0kg
	Drug	1.0~999.9mg
	Volume	1.0~999.9ml
	Dose	When the unit is ng/kg/min the dose range is 1~4294967290 When the unit is mg/kg/h, the dose range is 1~333300000000
	VTBI	0.0~9999.9ml

numerical key #2 to select **Time Mode**

Current infusion mode

TimeMode A [Signal] [Battery] 16 [Battery]

1. Time : 60 min — Preset time (min)

2. VTBI : 250.0 ml — Preset volume (ml)

Rate : 250.0 ml/h — Flow rate (ml/h)

Sum : 0.0 ml — Accumulated volume (ml)

Operating status

Stop [Arrow]

c. Press numerical key #3 to select **Body Weight Mode**

Current infusion mode

BW. Mode A [Signal] [Battery] 47 [Battery]

1. Wt. : 50.0 kg — Weight of patient

2. Drug : 5.0 mg — Weight of drug

3. Vol. : 250.0 ml — Volume of medical liquid

4. Dose : 1000 ng/kg/min — Dose: The amount of drug that enters the patient per minute per 1 kg of weight.

0.06 mg/kg/h

5. VTBI : 250.0 ml — Preset volume

Sum: 0.0 ml — Accumulated volume (ml)

Rate : 150.0 ml/h

Operating status

Stop [Arrow]

Mode Parameters can be set according to the table below:

When the parameters are set, press the Set key to return to the main menu.

3. Setting other parameters

Press and hold the Set key for 3 seconds to access the advanced setting interface. Before starting infusion, please make sure to set the following parameters:

- Select the type of IV set in use
- Set the KVO rate
- Set the Bed No.
- Set the air bubble alarm value threshold
- Set the occlusion alarm Value threshold
- Set the accuracy value

Adv. Set A [Signal] [Battery] 48 [Battery]

1. Bed No. : 11

2. KVO Rate: 1 ml/h

3. Tube : A Tube — Type of IV set being used. The system can remember up to 3 types.

4. Air Val. : 100

5. Occ. Val. : 100

6. Accuracy : 67

7. ID No. : 824 — Factory set ID no. Do not change.

Stop [Arrow]

The parameters in the advanced setting interface can be set according to the table below:

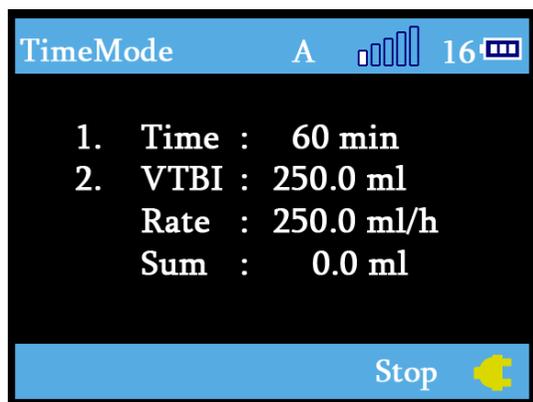
Required Parameters	Parameter Range
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Bed No.	1~1000
KVO rate	1 ml/h~5ml/h
IV set	Type A, Type B, Type C
Air Value (air bubble sensitivity)	1~1000
Occlusion Value (occlusion sensitivity)	10~100
Accuracy	30~108
ID No.	Do not change

When the parameters are set, press the Set key to return to the main menu.

4. Setting parameters with the numeric keyboard

Enter the menu interface you wish to use. Then select the parameter you wish to choose by pressing on the numeric keyboard the number assigned to that parameter. For example:



To set the Time parameter:

- a. Press the numeric key #1 on the numeric keyboard. The 60 will then be highlighted in yellow, allowing you to change the parameter value.
- b. Use the numeric keyboard to enter a new value.

- c. Once you are satisfied with the new value, press the Set key to save it. If you made a mistake and would like to re-enter the value, press the Clear key to clear the value and try again.

- d. If you entered the parameter to change it, but then changed your mind and wanted to remain with the value that was already there, press the Stop key to revert back to what it was and exit that parameter.

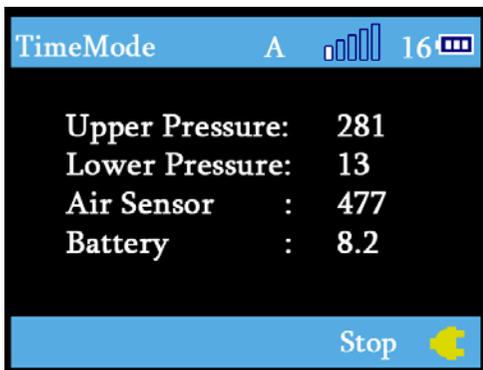
5. Parameter definitions:

- **Rate:** Infusion rate.
- **VTBI (Volume To Be Infused):** The liquid volume that you wish to infuse. Once set, the pump will automatically calculate the infusion rate and time. Cannot be set under Time Mode.
- **Time:** The amount of time you require the infusion to take place under.
- **Weight:** The patient's body weight.
- **Drug:** The drug quantity you wish to infuse.
- **Dose:** When the units used are ng/kg/min, it shows how much drug (ng) enters the patient per minute per 1 kg of weight. When the units used are mg/kg/h, it shows how much drug (mg) enters the patient per hour per 1 kg of weight.
- **Bed No.:** The bed no. of patients. This is useful with the infusion supervision system.
- **KVO rate:** KVO function will be activated if occlusion occurs, and runs at the KVO flow rate. The KVO symbol will show up on the LCD screen if it is activated.
- **IV set:** You can preset 3 types of IV sets that you use most often: Type A, B, and C. These presets will also remember all the parameter and accuracy calibration settings for each type of IV sets.
- **Air Val. (Aire Value):** This will be displayed when there is an air bubble alarm.
- **Occl. (Occlusion Value):** This will be displayed when there is an occlusion alarm.

- **Accuracy:** This influences infusion accuracy. This parameter must be set for each new type of IV set used. This parameter must be checked and updated at least every 6 months for each type of IV set you have programmed into the pump.
- **ID No.:** This is the infusion pump ID no. It is preset by the factory and should not be changed.

6. Checking the pressure sensor value

While in any mode interface (such as Rate Mode...etc.), press numerical key #9 to view the sensor and battery values. When done, press the numerical key #9 or the Set or Stop key to return to the mode interface you were just in.



Step 5: Eliminate the air from the IV set and clear the accumulated volume

Note: Make sure the IV set is not connected to the patient before air is eliminated completely.

To eliminate air from the IV set, press the Start key to start infusion. Keep going

until all air bubbles are pushed out and liquid drops out of the needle. Then, in any mode setting interface (such as Rate Mode), press the Clear key to return the accumulated volume to 0.

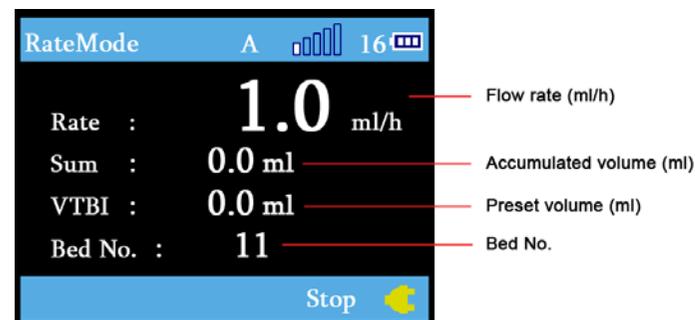
Note: The accumulated volume can only be cleared when the pump is stopped and not infusing. It can only be observed and cannot be cleared during infusion.

Step 6: Insert the intravenous needle into patients

Note: Only insert the intravenous needle into the patient when the pump is not infusing.

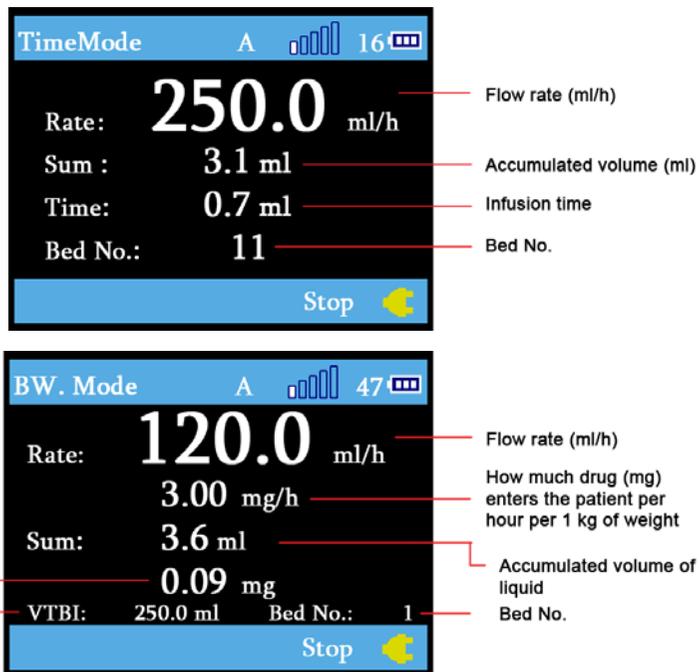
Step 7: Start infusion

Choose the mode of infusion and set up the corresponding parameters, then press the Start key to start infusion. The infusion indicator lights will flash in turns, showing infusion is in progress. The diagrams below show the infusion screen in all three modes.



When the accumulated volume meets the volume to be infused, the LCD displays "OVER" and sends an audible and visible alarm to remind the user that the infusion is finished. The infusion will automatically stop but the alarm will remain until the operator press the Stop key.

If you are done using the pump, press and hold the Power key for 3 seconds until the pump turns off.



The flow rate can be calculated automatically after setting the weight of patient, weight of drug, volume of medicine and dose.

Note: Infusion can only be started in the Mode Parameter Setting interface by pressing the Start key.

Step 8: Complete Infusion and turn off the pump

4.3 Bolus Function

While infusion is taking place, if the infusion rate is lower than 1000ml/h and you need a moment's fast-rate infusion, you may press and hold the Bolus key to initiate the bolus function. The pump will infuse at 1000ml/h as long as you keep your finger on the Bolus key. When you no longer need the bolus function, remove your finger from the key and the pump will return to the original infusion rate.

Note: If the infusion rate is higher than 1000ml/h, pressing the Bolus key will not start the Bolus function. Bolus function will only work when the infusion rate is less than 1000ml/h as the bolus rate is always 1000ml/h.

Note: The bolus function will not affect any alarm functions.

4.4 Changing the IV Set Brand

By default, the LT4810 is tested under and set up to use "Dragon Heart" brand IV sets as Type A, and Baxter brand IV sets as Type B. If you use other brands

of IV set, please reset the parameters by following these steps:

1. Prepare a new brand of IV set.
2. Install the IV set into the pump according to the instructions in this manual.
3. In the main menu interface, press and hold the Set key for 3 seconds to enter the advance setting interface, then set the parameters of the IV set (see below for details on setting the parameters).
4. The pump will remember up to 3 types/brands of IV sets along with all the corresponding parameters that you have specified for them.

Assign your IV set:

The LT4810 infusion pump can save up to three kinds of IV set parameters. When you turn the pump on, you will be sent to the Main Menu. Press and hold the Set Key for 3 seconds to enter the Advanced Settings menu. Then press “Numerical Key 3” for the IV Tube menu. Choose from “1,” “2,” or “3,” for “Type A”, “Type B”, or “Type C” IV sets. This just links your current brand to a letter. For example, if you choose Type B for a Baxter brand IV set, then from now on, when you change to Type B tubing within the pump, it will have the information that you have set for the Baxter brand of IV tubes. When you have chosen the letter to represent your new IV set brand, press the Set key to confirm.

There are three parameters which need to be set for each new brand of IV sets: Air bubble value, Occlusion value, and Accuracy value.

Set the air bubble value for alarm:

In the advanced setting menu, press “Numerical Key 4” to select the Air Value

setting. Enter a proper air bubble value for the alarm, then press the Set key to save the parameter. The suggested value is 100.

Set the occlusion value for alarm:

In the advanced setting menu, press “Numerical Key 5” to select the occlusion value. Enter a proper occlusion value for the alarm, then press the Set key to save the parameter. The occlusion value range is 10 - 100. The default factory setting is 50. The higher the value, the less sensitive the pressure sensor will be.

Set the accuracy value:

To set the accuracy value, you must first run the infusion pump to determine if the how much it needs to be adjusted.

Select Rate Mode as the infusion mode and set the infusion rate to 150ml/h, and the Volume To Be Infused (VTBI) to 10ml. Install the new IV tube properly. Then press the Start key to start infusion. Use a measuring cup to measure the liquid volume that flows out from the new IV set.

If the amount of liquid that flowed into the measuring cup is more than 10ml at the end of the test infusion, add 2 to the accuracy value for every 1ml extra of liquid. If the amount of liquid that flowed into the measuring cup is less than 10ml, reduce 2 from the accuracy value for every 1ml of missing liquid. If the liquid that flowed into the measuring cup is exactly 10ml, then there is no need to adjust the accuracy.

Once you have determined the Accuracy Value you wish to use, go to the Main

Menu. Select Advanced Settings by pressing and holding the Set key for 3 seconds. Make sure option number 3 for the type of Tube you are using is the one that you are working on (A, B, or C). Press Numerical Key 6 to select the accuracy setting. Enter the value you have determined based on the above infusion test, then press the "Set" key to save.

Example 1: If the actual amount of liquid that flowed into the measuring cup is 11ml instead of 10ml, and the initial accuracy value is 50, then add 2 to the original accuracy value for each 1ml of extra liquid. The new accuracy value should be 52.

Example 2: If the actual amount of liquid that flowed into the measuring cup is 8ml instead of 10ml, and the initial accuracy value is 50, then subtract 2 to the original accuracy value for each 1ml of liquid that is missing. The new accuracy value should be 46.

Repeat the accuracy test until you can confirm that the accuracy value no longer needs adjustment. (That means the actual liquid volume flowing into the measuring cup is the same as the volume to be infused.)

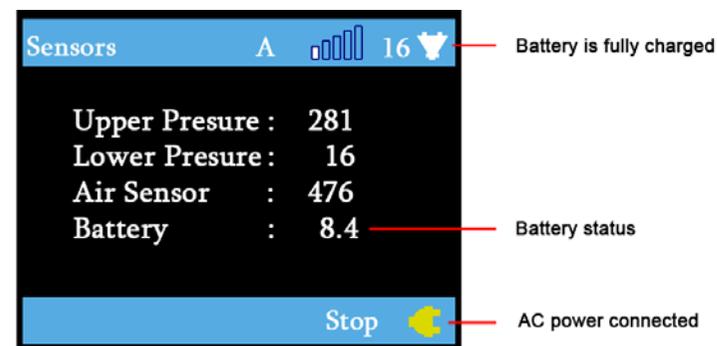
Note: The accuracy of infusion is $\pm 5\%$.

4.5 Battery Charge

The battery will automatically charge when the pump is connected to AC power and turned on at the same time. In any mode menu, press numerical key "9" to see the exact battery status. The normal range the battery should

be in is around 8. Anytime the battery is not at 8.4, the battery will automatically start recharging.

Note: The battery will only charge if the pump is turned ON and plugged into an AC power outlet at the same time.



When the infusion pump is disconnected from AC power, it will display the battery supply symbol on the upper right corner. This means the infusion pump is running on battery power. The lattice inside the symbol stands for battery capacity. When the battery power is low, the infusion pump will issue a warning sound to alert the user to charge the battery.

If the low battery alarm is ignored and the battery continues to drain, the pump will reach a point where battery power is nearly used up. At this point, the pump will give off the battery exhausted alarm and the battery indicator light will start to flash (This occurs when the battery capacity value becomes less than 7). The pump will no longer be able to infuse so infusion will stop automatically. The

infusion pump will switch off in about 5 minutes if the alarm is ignored.

Note: The infusion pump needs to be ON and connected to AC power for 8-14 hours to recharge the battery fully after the battery power is used up.

V. Alarms Causes and Solutions

When the infusion pump sounds an auditory alarm, the red indicator light will flash. The screen will display the reason(s) for the alarm.

Alarm	Causes	Solutions
Air Bubble	1. Air bubble in the IV set 2. IV set installation error 3. Malfunction with the sensors	Solution for No.1: Press the Stop key to stop infusion and silence the alarm. Remove the air bubble in the IV set, and then press the Start key to restart infusion. Solution for No.2: Reinstall the IV set properly Solution for No.3: Contact the manufacturer or sales agent for maintenance.
Completion	Infusion completed	Press the Stop key to stop infusion and silence the alarm. Then press the Clear key to eliminate the accumulated volume. The pump is now ready to be set up for the next infusion.
UP OCCL.	1. Infusion loop occlusion	Solution for No.1: Press the Stop key to stop

	2. Malfunction with the sensors	infusion and silence the alarm. Eliminate the infusion loop occlusion and then press the Start key to restart infusion. Solution for No.2: Contact the manufacturer or sales agent for maintenance.
DOWN OCCL.	1. Infusion loop occlusion 2. The occlusion value is much too sensitive. 3. Malfunction with the sensors	Solution for No.1: Press the Stop key to stop infusion and silence the alarm. Eliminate the infusion loop occlusion and then press the Start key to restart infusion. Solution for No.2: Refer to this instruction manual to adjust the occlusion value for alarm. Solution for No.3: Contact the manufacturer or sales agent for maintenance.
DOOR OPEN	1. Door of the infusion pump is open. 2. Malfunction with the sensors	Solution for No.1: Tightly close the door of the infusion pump. Solution for No.2: Contact the manufacturer or sales agent for maintenance.
IV Set Error	1. IV set installation error. 2. Malfunction with the sensors	Solution for No.1: Reinstall the IV set properly by referring to this manual. Solution for No.2: Contact the manufacturer or sales agent for maintenance.
Low Voltage	1. The battery is low on power 2. Battery aging or there's a malfunction with the battery charge circuit.	Solution for No.1: Connect the pump to the AC power supply to start charging the battery. Make sure the pump is turned on or the battery will not recharge. Solution for No.2: Contact the manufacturer or

		sales agent for maintenance.
Low Battery	1. The battery is low on power 2. Battery aging or there's a malfunction with the battery charge circuit.	Solution for No.1: Connect the pump to the AC power supply to start charging the battery. Make sure the pump is turned on or the battery will not recharge. Solution for No.2: Contact the manufacturer or sales agent for maintenance.
Check Tube	1. IV set installation error 2. IV set not installed	Solution for No.1: Reinstall the IV set properly by referring to this manual. Solution for No.2: There is no IV set in the pump. Please install the IV set by referring to this manual.
Abnormal 1	CPU data communication error	Contact the manufacturer or sales agent for maintenance.
Abnormal 2	Something is wrong with the motor	Press the Stop key to stop infusion and silence the alarm. Then press the Start key to restart infusion. If the alarm sounds again, please contact the manufacturer or sales agent for maintenance.

VI. Product Maintenance

6.1 Cleaning and Disinfecting

1. Keep the pump clean at all times. Use a piece of soft wet cloth with warm water to wipe the surface of the infusion pump when any liquid drops onto it.
2. Use a cotton swab moistened with 75% of alcohol to wipe the outer shell of the machine for disinfection, keeping the room ventilated for 2 hours.
3. Make sure to turn the infusion pump off and disconnect it from AC power supply before wiping the liquid off.
4. Do not use xylene, acetone or anything analogous to clean the infusion pump. These chemicals will cause damage to the outer shell.

Note: As per hospital policy, the pump needs to be thoroughly cleaned before use after a long period of storage.

6.2 Routine Maintenance

1. The pump must be tested for accuracy every six months. Use the measuring cup to test the IV sets being used and adjust the accuracy value accordingly as per the instructions in this manual.
2. To maintain battery performance, use the battery up completely once every month until the power turns off by itself. This will ensure battery performance and longevity. After the battery is depleted, recharge it

completely by plugging it into AC power and keeping the pump turned on for 8-14 hours.

3. Reinstall the IV sets and re-calibrate all the IV set parameters to make sure everything is accurate.
4. Inspect all cords and moving components of the pump to make sure everything is in proper working condition.

6.3 Replacing the Battery

Batteries are in the category of expendable parts and therefore, may need to be replaced. If the battery requires replacement, please contact the distributor or the manufacturer.

Battery Model: Lithium Polymer battery, 7.4V, 1600mAh.

Steps for replacing the battery:

1. Remove the four screws on the back cover of the battery compartment with a screwdriver and then open the back shell.
2. Take out the old battery together with the leads of the battery.
3. Insert the lead plug of the new battery into the corresponding circuit board interface, then put the battery into the battery holders.
4. Replace the foam and battery cover, then tighten all the screws up with a screwdriver to secure the back cover onto the pump once again.

6.4 Pollution-free Treatment and Recovery

To work toward a cleaner and better future for this planet, once the infusion

pump is no longer in use, it can be delivered to the manufacturer for proper recycling. Used Lithium Polymer batteries can also be delivered to the manufacturer for proper disposal, or the user may dispose of it as per applicable laws and regulations of the territory.

VII. Electromagnetic Compatibility and Interference

This infusion pump has a function to prevent external interference, including high-intensity radio frequency radiation, magnetic field and static. However, users should avoid using equipments which produce electromagnetic field within 0.5 meters from the pump, such as mobile phones, otherwise the electromagnetic interference will cause mechanical failure or machine collapse.

This infusion pump is quite low in electromagnetic frequency, which will not interfere with the surrounding electronic equipments. However this pump produces certain amounts of electromagnetic radiation, which is in compliance with IEC/EN 60601-1-2 and IEC/EN60601-2-24 standard. If interference is caused when this pump is used with other equipment, measures must be taken to reduce this interference, such as changing the location of these equipments in relation to each other.

Avoid using this pump in combination with MRI (Nuclear Magnetic Resonance Image) or anything analogous to this equipment, otherwise the electromagnetic

interference will cause mechanical failure or machine collapse.

VIII. Product Specification

Product Name	Infusion pump
Product model	LT4810
Infusion Pump Mechanism	Peristaltic Mechanism
Maximum flow rate	2000 ml/h
Flow rate range	1 ml/h-2000 ml/h
Bolus rate	1000 ml/h
Infusion increment	0.1
Water-proof classification	IP21
Infusion mode selection	1. Rate mode; 2. Time mode; 3. Body Weight Mode
Rate Mode	Rate: 1.0ml/h-2000.0 ml/h ; Possible VTBI: 0.0-9999.9ml
Time mode	Time: 1minute-2000minutes Possible VTBI: 1ml-9999.9 ml
Body Weight Mode	Weight: 0.1-300.0 kg Drug: 1.0-999.9 mg Volume: 1.0-999.9 ml Dose: when the unit is ng/kg/min, the dose range is 1-4294967290, when the unit is mg/min/h, the dose range is 1-333300000000; maximum values depend on weight, drug, volume, dose. Unit: mg/kg/h, ng/kg/min
KVO rate	Adjustable range: 1ml/h-5 ml/h The KVO function will run when the occlusion alarm sounds
VTBI Range	0.1ml-9999.9 ml

Time Range	0-2000 minutes
Accumulated Infusion Volume Range	0.1ml-9999.9ml
Infusion Accuracy	±5%
Power Supply	AC100V ~ 240V, 50Hz/60Hz
Battery	Rechargeable lithium polymer battery, 7.4V, 1600mAh.
Maximum Power Consumption	25VA, running more than 2 hours at the rate of 25ml/h after being fully recharged.
Battery Charge	When the infusion pump is connected to AC power and is ON, the battery will recharge automatically.(about 8-14 hours to recharge fully)
Fuses	T 2AL 250V
Displayed Information	Infusion rate, VTBI, volume infused, battery capacity, AC power indicator, over, occlusion, air bubbles, bed No., pressure value, etc.
State Indication Information	Infusion, stop, bolus, KVO
Alarm Information	Over, occlusion, air bubbles, low voltage, installation error of IV set, malfunction 1, malfunction 2, extremely low battery, battery exhaust, etc.
Air Bubble Detection	The minimum detectable size of an air bubble is 0.005ml at the rate of 600ml/h.
Infusion Pressure	The maximum pressure is 300kPa. The occlusion alarm pressure value is 39.2-137.2 kPa, the longest time of occlusion alarm is 2 minutes at the rate of 25ml/h; the longest time of occlusion alarm is 5 minutes at the rate of 5ml/h.
Dimension of the Outer Shell	265 mm (L) x230 mm (W) x175 mm (H); 10.43" (L) x 9.05" (W) x 6.89" (H)
Weight	< 3.0 kg; < 6.61 lbs
Classification	Class II, Type BF

Work Mode	Continuous operation
Outer Shell Material	ABS Plastic
Operating Conditions	Environment temperature 5°C ~ +40°C, air pressure (86 ~ 106)kPa, relative humidity ≤80%
Storage Conditions	Environment temperature: 20°C~ +55°C air pressure (50 ~ 106)kPa, relative humidity ≤95%
Applicable IV Sets	National standard IV sets
Applied Standards	IEC60601-1; 1988+A1; 1991+ A2; 1995.IEC60601-2-24; 1998.IEC60601- 1-2; 2001.ISO14971; 2007.ISO780; 1998

IX. Recommended Infusion Component

We test and set the parameters under the brand of "Dragon Heart" and "Baxter" IV sets. If you use other brands of IV sets which complies with the national standard, please reset the parameters and adjust the accuracy as per this instruction manual.

Note: Infusion accuracy may be influenced by solution consistency and proportion.

X. Maintenance Service

The warranty is 1 year beginning from the purchasing date. We can offer free repair service within the warranty time on condition that the product is operated properly. The following situation is not within the range of free maintenance and repair:

1. Malfunction caused by misuse, repair or reconstruction by any non-Lutech certified engineer or technician, unqualified or untrained persons.
2. Malfunction or damage caused during transportation after purchasing.
3. Malfunction or damages caused by fire, salt, poisonous gas, earthquake, hurricane, flood, abnormal voltage and other natural factors.
4. Any physical damage incurred after the pump has been delivered to the purchaser.

The company can provide the necessary circuit diagrams or components list for maintenance to authorized maintenance personnel only.

LT4810 IV Pump

