DigiPump LP8
Linear Peristaltic Infusion Pump

Operator's Manual
Read this manual carefully before operating equipment

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Introduction

A. About This Manual
This operator’s manual has been prepared to provide information on the correct use of the DIGICARE BIOMEDICAL TECHNOLOGY INC. Digipump™ LP8 Infusion Pump. It contains performance specifications and installation, operation and maintenance information. It is intended for trained health care professionals.
Follow each chapter in the manual sequentially if the infusion pump is being used for the first time.

B. Manufacturer’s Responsibility
• The manufacturer of this equipment is responsible for the effects on safety, reliability, and performance of the equipment only if:
  • The equipment is used in accordance with the instructions in this manual.
  • The electrical installation complies with all applicable regulations.
  • Assembly operations, extensions, re-adjustments, or repairs are carried out by personnel authorized by the manufacturer.
  • It is up to the user to ensure that any applicable regulations respecting the installation and operation of the infusion pump be observed. The operator should read this manual carefully and thoroughly before attempting to use the infusion pump.

Incorrect operation or failure of the user to maintain the infusion pump in accordance with proper maintenance procedures relieves the manufacturer or his agent from all consequent non-compliance, damage or injury.

C. Warranty
All products manufactured by Digicare Biomedical Technology Inc. are warranted to be free from defects in material and workmanship and to operate within published specifications, under normal use, for a period of one year from date of original shipment. The warranty on accessories is ninety (90) days.

If an examination by Digicare, discloses such products or component parts be been defective, then our obligation is limited to repair or replacement (at our option).

D. Unpacking and Accessories
Carefully remove the infusion pump and its accessories form the shipping carton. Save the packing materials in case the infusion pump must be shipped or stored. Ensure your Digipump™ LP8 has the items listed in the SHIPPING LIST inside the carton.
E. General Safety

E.1 – Indications
The Digipump™ LP8 infusion pump is a device designed for continuous operation. It is intended for use by person’s trained in professional health care. The operator must be thoroughly familiar with the instructions in this manual before using the instrument.

E.2 – Warnings

• The Digipump™ LP8 infusion pump was designed and tested accordingly to the EMC Standard IEC601-1-2. However, the operator is responsible to verify if the infusion pump is been affected or affecting others electrical equipment. Equipments like electrocautery and image scanners can generate interference and cause degradation of the Digipump™ LP8 infusion pump performance. To avoid this situation, it should be installed as far as possible of those equipment.

• The Digipump™ LP8 infusion pump is NOT intended to be used during MRI (magnetic resonance imaging).

• The Digipump™ LP8 infusion pump is NOT suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide. Do not operate this product in the presence of flammable anesthetics. Explosion may result.

• Follow the instructions on this manual. Set the parameters appropriately and use only the IV set which has been adjusted for the DigiPump LP8.

• Stop the device immediately in case of any abnormal functioning of the infusion pump.

• Keep the DigiPump LP8 far, at least 1 meter (3.0 feet) from other generating HF equipments such as electrosurgical unit and others.

• Before using the infusion pump, make sure the AC voltage at your installation site is correct for the AC rating for the device. If the rating is not correct, do not use the infusion pump and contact Digicare Customer Service for help.

• Follow local regulatory recommendations for Battery disposal. Do not overheat or place the battery into fire as it may cause leakage, burning or explosion.

• Do not tear or break battery sheath as it may cause explosion or chemical burning.

• Hold on the plug firmly when plugging in or pulling out the power cord. Do not touch the power plug with wet hand.

• Do not share the same power outlet with other appliances.

• Do not disassemble the device or modify it.

• Perform daily check before use. Make sure all functions perform well if the infusion pump is not being in use.

• Avoid vibration, collision or exposition to the direct sunlight or other strong light.

• Avoid the warm or wet air flow coming from heating or cooling apparatus such as air-conditioning, ventilator, humidifier, etc.
Chapter I. Overview

1.1. Application

The Digipump™ LP8 infusion pump is intended to be used in health care facilities for continuous and accurate infusion of liquids to patients.

1.2 Technical Specification

<table>
<thead>
<tr>
<th>specification</th>
<th>details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iv set requirement</td>
<td>10, 15, 20, 60 drops/ml (standard PVC with outer diameter: 3.4mm-4.5mm (0.134” – 0.178”))</td>
</tr>
<tr>
<td>Pump type</td>
<td>Linear Peristaltic pump</td>
</tr>
<tr>
<td>Control method</td>
<td>Drop count method</td>
</tr>
<tr>
<td>Air detection method</td>
<td>Ultrasound (8 levels of sensitivity are available)</td>
</tr>
<tr>
<td>Drop detection method</td>
<td>Infrared photo-electric beam</td>
</tr>
<tr>
<td>KVO (keep vein open)</td>
<td>1ml/hr (the lowest infusion rate to keep vein open)</td>
</tr>
<tr>
<td>Maximum flow rate</td>
<td>999.9ml/h - 10, 15, 20 drops/ml IV set</td>
</tr>
<tr>
<td>Drop rate accuracy</td>
<td>±2% (the specified accuracy is reached after the first 150 drops).</td>
</tr>
<tr>
<td>Flow rate accuracy</td>
<td>±5% (the specified accuracy is reached using adjusted IV set and after continued infusion over 100ml).</td>
</tr>
<tr>
<td>Occlusion pressure</td>
<td>40~140Kpa. Eight levels of sensitivity available</td>
</tr>
<tr>
<td>Volume infused display</td>
<td>0-9999ml</td>
</tr>
<tr>
<td>Volume to be infused setting</td>
<td>1-9999ml</td>
</tr>
<tr>
<td>Sound and light alarm</td>
<td>Air in line, door open, occlusion, pause overtime, infusion complete, abnormal drops, leakage, tube slope, low battery, damage battery, pump reversal, empty, abnormal drop detector, linear pump cassette abnormal, sound abnormal, low volume for adjustment, adjustment failure, adjustment function finished and cannot restart again, interruption of power supply.</td>
</tr>
<tr>
<td>Power source</td>
<td>≤25VA</td>
</tr>
<tr>
<td>Peristaltic linear pump</td>
<td>Detachable</td>
</tr>
<tr>
<td>Tube clamp</td>
<td>Detachable</td>
</tr>
<tr>
<td>Display</td>
<td>Color LCD with bright backlight</td>
</tr>
</tbody>
</table>
1.3 Description

• The DigiPump LP8 is designed for precise infusion of both general parental solution and solution with high surface tension, offering safety, performance and convenience with its easy-to-set adjustment and compensation functions.

• Applications include continuous infusion at operating room, ICU, CCU, chemotherapy, TPN, nutrition, infusion of oxytoxics and anti-cancer drugs.

• It allow the use of general purpose infusion sets. Variations in drop size during the infusion flow as changed by the infusion flow is automatically corrected by a built-in program in the pump to administer intravenous fluid over a long period of time without error.

• Standard IV sets (10,15,20,60drops/mL) can be used (we suggest the use of only high quality infusion set brand).

• The internal battery provides continuous infusion when moving the patient or in case the AC power loss (battery operation time is 4 hours if flow rate is below 30drops/min or 90ml/h).

• “Empty” function automatically program the volume to be the whole bottle.

• Flow rate selection between “ml/hr” and “drop/min”.

• The linear pump cassette is detachable and can be washed in water.

• The infusion set clamp is detachable and can be easily washed in water.

• Single-handed operation is possible.
1.4 Components and Functions

1.4.1 Front view

**LCD:** Display with Rate and Volume Indicators, infusion status and alarm messages.

**Keyboard:** menu settings pushbuttons

**Power indicator:** Ac and Battery Charge Indicators

**Handle:** Easy to carry

**Alarm light:** High intensity Alarm Light Indicator can be observed at distance

**Pump door switch:** Pull it to open the door

**Handhold:** Easy single-handed operation

**Pump door**

1.4.2 Infusion components

**IV guide slot**

**Linear pump cassette**

**Air detector**

**Occlusion sensor**

**Tube clamp**
1.4.3 LCD

**Adjust mode**: Adjust Mode Indicator

**Select IV set**: Set to 10, 15, 20 or 60d/ml

**Alarm messages window**

**Flow rate setting**: Set the Flow Rate in drop/min or ml/h

**Volume setting**: Set volume to be infused and display the total volume infused

---

1.4.4 Keyboard

**Confirm key**: To confirm and store the data

**Start/Stop**: It lights when turn on the pump

**Arrow-key**: To advance and return throughout the display menu settings

**Data Input Key**: Press it to increase or decrease the data.

**Silence switch**: Press to disable and enable the audio alarm.

**Clear-key**: Clear the alarm or the setting parameter to zero.

**Purge rate**: Press and hold to start the purge function. Release to stop.

**Power indicator**: When ☀️ illuminates, indicate powered by the internal battery. When ⚡️ illuminates, indicates powered by AC mains.
1.4.5 Rear view

**Drop detector:** Place it at this point when it is not in use.

**Adjust for Occlusion Pressure, Air IN Line** alarm sensitivity and **Alarm volume**

**AC power switch:** Class II, type CF, Drip-proof design

**AC Power receptacle:** Class II type CF, Drip-proof design

**Pole Mount**

**Auto Adjust:** Press the key to adjust the IV set automatically.

**Drop detector receptacle**

**Battery compartment** Remove the screw to access the battery

1.4.6 Bottom components

**Battery Compartment**

**Battery**

**Fixation nip at the bottom:** when there are many infusion pumps working at the same time, you can fix these pumps on the bar through the nip.
Chapter II. Installation

2.1 Packing list

When opening the package, verify that the items below are enclosed:

1) Infusion pump …………1
2) Drop detector …………1
3) Knob bolt ………………1
4) Power cord…………….1
5) Operator Manual…………1

2.2 Installation

2.2.1 Set the knob bolt firmly

Attach the knob bolt to the pole holder located on the rear of the pump.

2.2.2 Set drop detector

1) As showed in the picture on the right, insert drop detector plug in the receptacle at the rear panel.
   Note: If the drop detector is not well connected, the display will show “Err Err Err Err Err Err”.

2) When the drop detector is not in use, it shall stay on the position showed in the picture.

Chapter III. Basic Operation

3.1 Preparation

The battery should be charged before using the pump for the first time or if it has been stored for a long time.

1. Connect the power cord to AC power receptacle;
2. Press “POWER” over 0.5 second to turn on the machine. The AC power “ ” indicator light will illuminate and the battery indicator “ ” will flash and the charge will begin;

3. Press “POWER” over 0.5 second to turn off the power. The “ ” flashing indicates it is in charging state. Approximately 16 hours later the indicator light “ ” stop flashing, indicating the battery is fully charged.

3.2 Installation

3.2.1 Install the machine

1. To attach the pump firmly on the IV pole, please use the knob bolt and pole holder located on the back panel. Place IV pole through the opening and tight knob bolt firmly.

2. Connect power cord to receptacle, turn on the switch in the rear panel, press “POWER” over 0.5 second. If “ ” flashes it indicates that the power supply is connected.

3. The infusion pump will perform self-check automatically after it is turned on. This test includes: if the battery is charged, if the drop detector is attached, if all the system functions are normal. If something is not correct, an alarm will be trigged indicating the error code (such as AIR, LOW BATTERY, Errs etc.).

4. After turning on, the device will check the battery automatically. If the charge is low, it will recharge automatically and “ ” will flash.

Note: If the machine is not connected to the AC power or if the power is cut off, the pump will change automatically to battery operation and the indicator “ ” will come on. The indicator “ ” flashes and sound alarm is triggered indicating AC power loss. Press any key to clear the alarm.

3.2.2 IV Set Installation:

1. Close of IV set roller clamp. Insert IV set drop chamber sharp extremity into the outlet of the solution container.

2. Press drop chamber of IV Set gently between fingers few times to fill 1/4-1/3 chamber full, as shown in the picture.
Note: To make sure it can infuse normally, do not leave the chamber full of liquid or the pump will not be able to detect the drops. At the same time, if the chamber is not filled with liquid at least 1/4, the pump will easily alarm because of the bubble formation in the chamber.

3. Open the roller clamp to remove air from IV set tubing.
   Then close the roller clamp.
   
   Note: Make sure the air filter is open and tubing is correctly placed in the pump or it may cause occlusion and alarm.

4. Open the door and pull the tube clamp (D) to the left to insert the IV set.

5. Keep the IV set tube straight and insert it to the guides A, B and C

6. Release the roller clamp;
   
   Note: Make sure it doesn’t drip in the drop until you start the infusion.

3.2.3 Install the drop detector

Install the drop detector following the instructions below:

1. Place the drop detector at middle point above the liquid level and bellow the chamber drop point. (As show in the picture)

   Drop

   Indicator light of drop detected: It will light for each drop detected

   1/4-1/3 of liquid

   Keep the drop detector flat

   Note: Make sure to install the drop detector correctly according to the above instructions or it may cause alarms and errors.

2. Keep drop chamber straight. If it is over sloping, it may cause alarms and errors.
3. Keep drop detector away from direct sun light or other source of strong light or it may cause alarms.
4. When there is liquid on the sidewall of the chamber, shake it gently to clear the sidewall and make sure the drops are detected correctly.

3.3 Select the type of IV set

1. Press “” or “”, set the cursor at “IV SET”. When the “IV SET” flashes, it means it is selected;
2. Press “+” or “-” to choose the type of IV set which you need, 10, 15, 20 or 60 drop/ml”. Press “CONFIRM” to confirm;

**NOTE:** If the IV set is selected incorrectly it will seriously affect the infusion accuracy. Make sure you set the appropriate IV set.

3.4 Setting the adjustment factor

**Warning:** To keep the highest infusion accuracy, we recommend to use a reliable, standard PVC IV set (Outer diameter is 3.4mm-4.5mm). If you use one IV set which cannot meet this requirement, it may affect the accuracy.

### Possible errors that affect accuracy

<table>
<thead>
<tr>
<th>Error</th>
<th>How to Solve</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The IV set used diameter is different from the default programmed</td>
<td>The IV set must be adjusted. Please refer to the “3.9.4 Auto-adjustment for IV set ”or “3.9.5 Manual-adjustment for IV set ”to get the IV set adjustment value.</td>
</tr>
<tr>
<td>2. Infusion of a liquid with high surface tension</td>
<td>High surface tension liquid requires adjustment value referring to the value sheet (see table 3.4)</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Most drug liquid has low surface tension and not need adjustment. Only for the high surface tension liquid need adjustment factor.</td>
</tr>
</tbody>
</table>
3. IV set distortion due to long time use in the same tube segment

1) After the IV set has been used over 5-6 hours, we suggest reposition the IV tubing down or up 20cm for the linear pump cassette act on a new tube position.

2) We suggest the replacement of the IV set when it has been used for 20 hours or more.

### Table 3.4

<table>
<thead>
<tr>
<th>Liquid</th>
<th>Adjustment value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard (low surface tension)</td>
<td>0%</td>
</tr>
<tr>
<td>Dextrose (10%)</td>
<td>+5%</td>
</tr>
<tr>
<td>Dextrose (50%)</td>
<td>+10%</td>
</tr>
<tr>
<td>TPN</td>
<td>+5~10%</td>
</tr>
<tr>
<td>TPN+ fat-soluble vitamin</td>
<td>+10~20%</td>
</tr>
</tbody>
</table>

1. Assume that you want to infuse dextrose (10%) solution. The corresponding adjustment value is +5% (table 3.4).

   The IV set adjustment value is +3% through **3.9.4 Auto-adjustment for IV set** or **3.9.5 Manual-adjustment for IV set**;

2. The total adjustment value = IV set adjustment value (3%) + High Surface Tension liquid adjustment value (5%), so the value needed as adjustment factor shall be 8%.

3. Press “”“” or “”“” to place the cursor at **ADJUST MODE**, the **ADJUST MODE** flashes;

4. Press “”“” or “”“”, set 8%, then press **CONFIRM**.

Warning: Setting a wrong Adjustment Factor will reduce the specified accuracy.
3.5 Setting the flow rate and volume to be infused

1. **Flow rate setting:** press “↑” or “↓” to move the cursor to “/min” or “/hr”; At this time, “/min” or “/hr” will light. Press “+” or “-” to set the digit. Move to next digit pressing “↑” or “↓” and move the cursor on the digit you want to set. Continue with this procedure until you finish the rate value setting, then press “Conf.”.

2. **Volume to be infused setting:** press “↑” or “↓”, point the cursor on “/LIM”, The “/LIM” will light. Set the volume digits following the same procedure as above, then press “Conf.”.

3. **Rate and Volume Setting Range**

<table>
<thead>
<tr>
<th>IV set</th>
<th>/H</th>
<th>Drops/Min</th>
<th>Volume Limit Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 drops/ML</td>
<td>1.0-999.9</td>
<td>1.0-166.6</td>
<td>1-9999ml</td>
</tr>
<tr>
<td>15 drops/ML</td>
<td>1.0-999.9</td>
<td>1.0-249.9</td>
<td>1-9999ml</td>
</tr>
<tr>
<td>20 drops/ML</td>
<td>1.0-999.9</td>
<td>1.0-333.3</td>
<td>1-9999ml</td>
</tr>
<tr>
<td>60 drops/ML</td>
<td>1.0-150.0</td>
<td>1.0-150.0</td>
<td>1-9999ml</td>
</tr>
</tbody>
</table>

4. **Empty bottle mode:** When setting the Volume Limit, press the “/LIM”. The volume setting will indicate “ALL” and will go to the “Empty” bottle mode, then press “Conf.” to confirm. Pressing “START” start infusion and the pump will infuse all liquid in the bottle automatically.

5. **Volume Infused Display:** This indicator display the total volume infused. To clear this indicator press “↑” or “↓” and point the cursor on “/LIM”. The “/LIM” will flash. Press “CLEAR” for 0.5 seconds. The device will sound a beep and reset total volume indicator to “0”, then press “Conf.” to confirm.

3.6 Starting Infusion

1. Make sure all settings are correct;
2. Make sure there is no bubble in the IV set, then perform venipuncture;
3. Press “START” to start infusion. The LCD “ ” moves indicating the infusion is running;

Attention: Observe if the drop detector lights for each drop detected

3.7 Finishing Infusion

1. When volume infused display reaches volume to be infused (limit) setting, the pump will display a “FINISH” alarm to notify that the infusion is completed. The pump will turn to KVO function. The minimum flow rate is maintained to prevent occlusion. Press “START” to stop KVO function.

3.8 Powering Off

1. Press “POWER” for 0.5 seconds until powered off;

3.9 Extended Operation

3.9.1 Pause/Restart

a) Pause infusion: pressing the “STOP” during infusion will pause the pump.

b) Restart: pressing the “START” again, the pump will restart the infusion.

NOTES: Pausing for more than 2 minutes will activate the alarm system (Pause Overtime)

Press “CLEAR” to clear the alarm and maintain the pause state.

3.9.2 To continue another solution container

1. Change to a new infusion container and make sure that the IV set is connected correctly.

2. Change the IV tubing down or up 20cm to make the linear pump cassette act on a new position of tubing after the IV set has been used over 5-6 hours.

3. The total infused volume will add with the new volume to be infused programmed. If you want to clear the total infused volume display:

   With the “TOTAL” flashing, press “CLEAR” for 0.5 seconds and the display will reset to 0.
**Notes:** Turning power off and back on, reset the total infused volume to “0” automatically. The IV set, flow rate, adjustment value and volume to be infused (limit) will keep the last programmed settings.

The maximum volume displayed is 9999ml. If the total volume exceeds this value the display will stay showing 9999m.

4. After all settings for IV set, Flow rate, adjustment factor and volume are done, press “STOP” to restart infusion.

### 3.9.3 Purge Function

This function can be used to fill in, cleaning IV set or remove the air from the IV set quickly. In addition, it can also be used for high rate infusion in a short time such as first aid etc. Please follow the steps below.

1. In Stop mode, press“ ” button for 1.0 second to perform the purge function.

2. Just release the“ ” to stop the purge function.

3. Purge Rate: for 10, 15, 20 drops/ml, IV set purge rate is 600ml/h; for 60 drops/ml, IV set purge rate is 150ml/h.

**NOTE:** During purge function, air in line alarm will only trigger a visual alarm, and not the audible alarm, and the infusion will not stop. The volume infused is not added to the Total Volume Infusion indicator.

### 3.9.4 IV Set Auto-adjustment

In order to keep the maximum specified infusion accuracy, we recommend the use of a reliable standard PVC IV set (outer diameter is 3.4mm-4.5mm). Use 0.9% standard physiologic solution or pure water for adjustment following the steps below:

1. Hang the liquid container filled with 200ml (or more) physiologic solution or pure water.

2. Close the IV set roller clamp and make sure that no leakage occurs.

3. Insert the IV set drop chamber to the liquid container, place the IV set in the pump with the drop detector attached correctly, then open the roller clamp.

4. Connect to AC power and turn on the pump.
5. Press the “AUTO ADJUST” key on the back panel, the display indicator \textbf{ADJUST MODE} will flash and a beep will sound indicating the adjustment mode has been entered.

6. Press “” or “” to move the cursor to \textbf{SELECT IV SET} and set the type of IV set.

7. Press “” or “” to move the cursor to \textbf{mL/hr} and set the flow rate to 200ml/h.

8. Press “” or “” to the cursor at \textbf{mL LIMIT} and set the volume limit to 200ml.

9. Press “START STOP” to start the auto-adjustment function, pay attention to the drop detector indicator light whether it flashes at each drop detected.

10. During the auto-adjustment procedure, \textbf{ADJUST MODE} will flash to show it is in the process of adjustment. When 200ml has been infused completely, the pump will stop automatically and alarm.

11. The LCD will indicate “FINISH” after successful auto-adjustment, \textbf{ADJUST MODE} will flash and the adjustment factor value will be displayed. You can press \textbf{CONFIRM} to store the value. If the process of adjustment does not run properly and stops (Open, Occlusion etc.), or if the adjustment value is not in the range of -30% to +30%, the LCD will indicate “Err” alarm to show the failure of the adjustment process. You need to turn off the pump then turn on again and restart the adjustment process.

12. Check whether the solution container has been emptied. If not, the adjustment value will be useless. Reset the machine and repeat the steps mentioned above until the valid adjustment value is obtained.

13. The \textbf{ADJUST MODE} will flash and the adjustment value (automatically calculated by system) is displayed. Press \textbf{CONFIRM} to confirm and store the result in the memory which will be used as default setting on the next power on.

\textbf{Note:} If the hospital uses different types of IV sets, you must get their corresponding adjustment value according to the auto-adjustment function mentioned above. Write them down and set the corresponding value when use, it will ensure the maximum infusion accuracy.

\section*{3.9.5 IV set Manual Adjustment}

The user can calculate the error and manually enter the adjustment factor.

1. To verify error in IV sets of different brand or type, use 0.9% standard physiologic solution or pure water for infusion. Set the flow rate to 125ml/hr (range: 100ml to 150ml/hr).

2. After more than 50ml is infused, calculate the adjustment factor.
3. The formula for adjustment is:

\[
\text{Adjustment Value(\%) } = \frac{\text{Volume Infused Display} - \text{Actual Volume Infused}}{\text{Actual Volume Infused}} \times 100\%
\]

Note: “Volume Infused Display” is for “TOTAL” volume. In order to measure the “Actual Volume Infused” you need to use a graduated glass or similar to measure the actual infusion volume by yourself. The adjustment for IV set should be in the range of -30% to +30%.

### 3.9.6 Occlusion Valve Adjustment

Use one small flat screwdriver to rotate the potentiometer located on the back panel and adjust the Occlusion Pressure level to alarm. The Pressure range is 40Kpa to 140Kpa divided in 8 levels.

**Note:** When the pressure in the infusion set reaches the Occlusion Limit Pressure, an alarm is triggered and stop infusion. The time to alarm Occlusion is directly related with flow rate and occlusion limit pressure set.

**Note:** Turning the potentiometer clockwise increase the Pressure limit to alarm Occlusion.

<table>
<thead>
<tr>
<th>Position indication</th>
<th>1drop/Min</th>
<th>80drops/Min</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
<td>Time to Alarm 5 min. 37 s.</td>
<td>Time to Alarm 5.6 seconds</td>
<td>0.37mL</td>
</tr>
<tr>
<td>Position 8</td>
<td>Time to Alarm 18 min. 16 s.</td>
<td>Time to Alarm 10.5 seconds</td>
<td>0.7mL</td>
</tr>
</tbody>
</table>

### 3.9.7 Sound Volume adjustment

The alarm sound volume can be adjusted by using a small flat screwdriver to rotate (clockwise to increase or anticlockwise to decrease) the potentiometer located on the back panel. (as shown in the picture)

Alternatively, no sound alarm can be obtained by pressing the MUTE on the front panel. For security, the alarm sound will be activated again after 3 minutes.
3.9.8 Toggle switch

5 toggle switches are provided at the bottom of the infusion pump. They are used for engineering only.

**Note:** Pin the down position they are ON

In the up position they are OFF

For normal operation all 5 switchws shall be kept to OFF.

3.9.9 Battery

In the following cases, the pump will automatically switch to battery supply and the indicator ‘‘ will illuminate.

(1) The AC power supply is cut off.

(2) AC power switch is turned off.

**Note:** When the battery is low, “LOW BATT” will flash with alarm.(The infusion pump will stop infusion after 27 minutes, and turn off automatically after 30 minutes).

When the AC power is reconnected the infusion pump will recharge the battery automatically.

3.10 Trouble Shooting

3.10.1 Alarms and Alarm Codes

<table>
<thead>
<tr>
<th>Alarm code</th>
<th>Possible causes</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="AIR" /></td>
<td>No IV set installed or IV set not properly installed</td>
<td>Check whether IV set is mounted to the specified position for air detection.</td>
</tr>
<tr>
<td><img src="image" alt="AIR" /></td>
<td>Air in tube</td>
<td>1. Open the pump door, the tube clamp will grip tube tightly automatically. 2. Remove the tubing upper of the tube clamp. 3. Tap on tubing to expel the air back to drop chamber. 4. Reinstall the tubing and close the pump door. Continue the infusion.</td>
</tr>
<tr>
<td>Occlusion in solution container</td>
<td>Check whether the air inlet of solution container is</td>
<td></td>
</tr>
<tr>
<td>Alarm Code</td>
<td>Alarm Message</td>
<td>Action</td>
</tr>
<tr>
<td>------------</td>
<td>---------------</td>
<td>--------</td>
</tr>
<tr>
<td>Alarm not cleared</td>
<td>Press “CLEAR” to clear the alarm.</td>
<td></td>
</tr>
<tr>
<td>Pump door is open.</td>
<td>Close and lock the pump door</td>
<td></td>
</tr>
<tr>
<td>IV Tubing folded</td>
<td>Check whether the IV tubing is folded</td>
<td></td>
</tr>
<tr>
<td>Roller clamp is closed</td>
<td>Open the roller clamp</td>
<td></td>
</tr>
<tr>
<td>Needle is blocked</td>
<td>Check whether the needle is blocked</td>
<td></td>
</tr>
<tr>
<td>Occlusion in IV tubing</td>
<td>Replace the IV set or lower down the sensitivity of occlusion</td>
<td></td>
</tr>
<tr>
<td>1. Battery voltage is low</td>
<td>When running on battery, LOW BATT indicates that battery voltage is low. Promptly connect to AC power or replace with same type battery.</td>
<td></td>
</tr>
<tr>
<td>2. Battery failed</td>
<td>When running on AC, LOW BATT indicates that battery failed. Check the connection of the battery or replace with same type battery.</td>
<td></td>
</tr>
<tr>
<td>Infusion finished</td>
<td>1. Change to new solution container, and set the parameter again. 2. Infusion is finished, remove the IV set.</td>
<td></td>
</tr>
<tr>
<td>Auto-adjustment finished</td>
<td>Turn off the machine and restart. (The  flashes)</td>
<td></td>
</tr>
<tr>
<td>Motor rotation abnormal</td>
<td>Please stop to use and contact customer service</td>
<td></td>
</tr>
<tr>
<td>Error Code</td>
<td>Description</td>
<td>Steps</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Err2       | Drop detector disconnected           | 1. Check and make sure the Drop detector is connected and mounted properly.  
                      |                                                                     | 2. Check whether the connector is broken.                               |
|            | Pause overtime                       | 1. Press “CLEAR” to clear warning. But pause is maintained.           |
|            | (>2 min)                             | 2. Press “START” to restart infusion.                                 |
| Err4       | Leakage                              | 1. Check whether the IV set is mounted correctly.                     |
|            |                                     | 2. Check whether the drop detector is violently disturbed or shacked.  |
| Err5       | No drops detected                    | 1. Check if the solution container is empty.                          |
|            |                                     | 2. Check whether there are too many fog drops in the drop chamber or the drop chamber is too sloping, the liquid is not dripping but flowing through the sidewall of the chamber. |
| Err6       | Pump Cassette not running            | 1. Defective IV set or installed improperly causing the pump blocked. |
|            |                                     | 2. Pump cassette can’t run due to residues and dirty                  |
| Err7       | Abnormal pressure detection          | Refer to the solutions of eliminating the problem on“OCCL” alarm. If failed again, contact customer service |
| Err8       | IV type setting error                | Check whether the type of the IV set is correct.                      |
| Err9       | Abnormal Infusion                    | 1. Check whether the drop detector is connected and mounted properly. |
|            |                                     | 2. Check whether there are too many fog drops in the drip chamber or the liquid level of chamber is too high. |
|            |                                     | 3. Check whether the air inlet of solution container is blocked.      |
| ErrA       | Abnormal audio                       | Stop using and contact customer service                               |
### Errb
Adjustment finished, please restart
Turn off and restart

### ErrC
The volume limit for the auto-adjustment is too low
Refer to the operator manual (3.9.4 (8))

### Errd
Auto-adjustment failed, please restart
If occurs alarm such as “OPEN”, “OCCL”, “Pump not running” in the process of auto-adjustment, turn off and restart the machine. Re-do the auto-adjustment according to 3.9.4.

*Note: The infusion volume in the single failure is less than 0.7ml.*

#### 3.10.2 Other failures

Check the following before contact customer service:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Checking points</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press “POWER” but can’t turn on</td>
<td>Whether the battery is installed properly</td>
<td>Reinstall the battery properly.</td>
</tr>
<tr>
<td></td>
<td>Whether the AC power is connected</td>
<td>Connect to the AC power, and turn the rear panel switch on.</td>
</tr>
<tr>
<td>Failed to infuse, unusual sound emitted from linear cassette.</td>
<td>Whether there is something stuck on the linear pump cassette.</td>
<td>Remove the cassette and clean the components.</td>
</tr>
<tr>
<td>IV set installed and no air in tube, but “AIR” still flashes.</td>
<td>Whether IV set is mounted properly. Whether the tube is distorted</td>
<td>1. Press “CLEAR” to clear the alarm. 2. Mount the IV set correctly. 3. Make sure no distortion occurs;</td>
</tr>
</tbody>
</table>

#### 3.11 Daily check

<table>
<thead>
<tr>
<th>Checking items</th>
<th>Checking Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check whether the exterior of LP8 is damaged</td>
<td>Check the exterior of LP8</td>
</tr>
<tr>
<td>Check whether the power cord is damaged</td>
<td>Check the power cord</td>
</tr>
</tbody>
</table>
Chapter IV. Maintenance

4.1 Daily Maintenance

EOG sterilization; ultrasonic sterilization as usual as possible. Avoid to clean with Organic solvent like diluent, alcohol etc.

4.1.1 DigiPump LP8 Enclosure

Clean the case with a soft cloth immersed in mild detergent.

4.1.2 Air detector

Gently wipe the detector surface with dampened cotton, and dry it well. Be careful not to damage the detector surface. If it is damaged, it can cause failure of air detection.
4.1.3 Finger pump cassette

Remove the finger pump cassette and wash it, wipe it with dry cotton and mount back.

4.1.4 Tube clamp

1) Loosen screw and remove the tube clamp.
2) Wash the tube clamp in water.

Dry it well. Then assemble tube clamp and fasten the screw.

4.1.5 Drop detector

1) Wipe the drop detector with a cloth dampened with warm and a mild detergent solution.
2) Dry it with a dry cloth and mount it back.

4.2 Battery

Make sure to keep the battery fully charged before use.

1) When LP8 has been stored for a long period, the battery will require recharging.
2) The battery will require recharging every 6 months.
3) Normal battery life is 2 years.
4) For safety, replace with the specified type of battery.

Note: Disposal of damaged batteries shall be handled in accordance with the local rules, recycle if possible.

4.2.1 Recharging

When the Low battery alarm, connect with the AC power, make sure the AC power switch is on, and the device will recharge automatically.

1) Press \( \text{POWER} \) 0.5 seconds to turn on the power, when “\( \checkmark \)” light, “\( \pm \)” flashing, it starts to charge;
2) Press “\( \text{POWER} \)” 0.5 seconds to turn off the power, it continues to charge; In approx 16
hours, "±" stop flashing and the battery will be fully charged.

4.2.2 Replacement

1) Loosen screw to remove battery cover. Unplug connector and remove battery.
2) Replace battery, and attach battery cover. Make sure that the battery cover does not smash the battery cable.

4.3 Periodical replacement of some items

The following parts should be replaced periodically, the replacement time may be shortened depending on conditions.

<table>
<thead>
<tr>
<th>Parts</th>
<th>Recommended replacement period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>2 years</td>
</tr>
<tr>
<td>Finger pump cassette</td>
<td>3 years</td>
</tr>
</tbody>
</table>

4.4 Storage

Store the DigiPump LP8 in the following environment after cleaning.

Ambient temperature : $+5^\circ\text{C} \sim +40^\circ\text{C}$ (41°F $\sim 104^\circ\text{F})$  
Relative humidity : $\leq 90\%$

Atmospheric pressure : 70KPa~106Kpa

**Do not store the DigiPump LP8 in the following places:**

a) Direct sun light or strong light.
b) Direct wind from heating apparatus, air conditioner, ventilator or humidifier, etc.
c) Where there is water splash-up.
d) Where chemicals are stored or gases are generated.
e) Where there is excessive dust or vibrations.
f) Where the floor is not level.
4.5 Explanations of symbols

⚠️: Files must be read before the machine is used.

☐: According to the safety classification of medical electrical and electronic equipment, it is class II equipment.

❤️: According to classification of electrical and electronic equipment with regard to protection against electric shock, it belongs to CF type equipments.

IPX4: It is rainproof instrument.
WARRANTY TERMS & CONDITIONS

DIGICARE BIOMEDICAL TECHNOLOGY, INC. covers all of their infusion pumps with a 1 year warranty:

Infusion Pump DigiPump LP8: 1 year parts and labor
Accessories: 90 days on accessories only

DIGICARE BIOMEDICAL TECHNOLOGY, INC. will provide the necessary parts and labor to maintain the monitor(s) listed on the Warranty Certificate in a usable condition during the covered period.

DIGICARE BIOMEDICAL TECHNOLOGY, INC. will, at its option, repair or replace any product which proves to be defective during the warranty period, if returned to the factory with prior authorization, transportation prepaid.

Not covered by this agreement are repairs necessitated by any of the following conditions:

1 - Inadequate power or power failure.
2 - Neglect, abuse or misuse of equipment.
3 - Servicing of equipment by persons other than DIGICARE INC.
4 - Any unit opened or tampered with, without prior authorization.

When returning a infusion pump for extended warranty repair, you must first contact DIGICARE BIOMEDICAL TECHNOLOGY, INC. to receive a Returned Goods Authorization Number (RGA #) that is to be clearly marked on top of the shipping carton. Please make sure that your company name, shipping address, area code and telephone number and person to contact is located in and/or on the box. ANY UNIT THAT IS RETURNED TO THE FACTORY WITHOUT AN RGA# WILL BE REFUSED.

Model # __________________________ Serial # _____________________
Dealer Name: ____________________________________________
Date Equip. Purch.: ________________________ Expiration Date: ___________________

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