1. General information on peristaltic pumps

Peristaltic tube pumps are ideal for fluid transfer, metering and dispensing. In contrary to centrifugal and gear pumps, peristaltic pumps handle fluids of various viscosities, are self priming and can operate in either flow direction.

With no valves, seals or packing to come in direct contact with the pumped fluid, they are ideal for pumping high purity & corrosive fluids and for contamination free dosing.

The principle of the peristaltic pump is based on a tube which is squeezed by a series of rollers. As a general rule, the higher the number of rollers and the smaller the tube diameter—the lower are the flow rates but better is the accuracy and precision.

The 9700+ controller is equipped as a standard with 3 roller system and Ø3.0mm ID tube. This tube diameter together with maximum speed delivers a max flow rate of 250ml/min.

This combination offers an ideal tool for applications which require volumes between 1ml/min and 250ml/min. For smaller dispense volumes use the Ø2.0mm or Ø1.0mm ID tube. These peristaltic tubes are available as accessories. The pump is also designed to work in continuous mode.

2. Pump speed adjustment

To adjust the dispense turn the rotating knob on the top of the housing clockwise to increase the flow.

3. Changing the pumps direction

The pump controller can be used for dispensing or aspirating reagents. The slide switch on the left side of the unit sets the direction that the pump rotor rotates.

4. Continuous dispense mode

To run the pump continuously press the red toggle start button. You can stop the pump at any point by pressing the same button.

The pump can run for a momentary period by pressing the start button partially.

Please note: running the dispense tubes dry over a long period will shorten their life.

5. Remote Control Socket

Boxer 9700 is equipped with a remote switch socket. You can plug a foot switch pedal and work hands free or control the pump operation from your computer using a USB Relay Controller.

6. Unpacking

Remove the packing materials, unpack the pump controller and the power supply unit.

Make sure that you have all the following components:

- UNO Universal 9100 pump controller — Cat. No. 9700.000
- Power supply unit — Cat. No. 9100.004
- ID3.0mm Santoprene tube (fitted) — Cat. No. 9000.518

Please contact your supplier immediately if you notice any one of the components is missing or damaged.

Note: Do not attempt to assemble a unit using damaged components.

Retain the packaging so it can be used for future shipping.

For high purity & corrosive fluids and for contamination free dosing, peristaltic pumps have a number of benefits:

- No valves, seals or packing to come in direct contact with the pumped fluid.
- Ideal for pumping high purity and corrosive fluids.
- Contamination free dosing.
- Self priming.
- The principle of the peristaltic pump is based on a tube which is squeezed by a series of rollers.

Uno International Ltd. will only use materials and production techniques that cause least environmental damage.
7. The peristaltic tube
The peristaltic tube is made from Santoprene and the connectors are Nylon (PA). Please make sure the reagents you intend to use are compatible with these materials (See compatibility chart).

8. The choice of tubing
The unit can work either with fixed length tubing such as the supplied tube within the tube clamp, or with continuous tubing which in effect does not have any length restriction. In both cases, the correct tube clamps have to be installed in the clamp.

For fixed tube length you can choose between Silicone and Santoprene in 3 tube sizes. All tube options are listed under the Accessories heading.

For the continuous tubing there are three sizes of clamps.
1. Marked ‘1’ for ID Ø1.0mm tube
2. Marked ‘2’ for ID Ø2.0mm tube
3. Marked ‘3’ for ID Ø3.0mm tube

When using continuous tubing, make sure that the tube is fitted so that it is in contact with the inner surface of the tube clamp.

12. Care & maintenance
The control unit is maintenance free. The peristaltic tubes however require replacement as soon as excessive wear or a large variation in dispense volumes are noticed.

Avoid running the tubes dry for longer than a few minutes.

The operational life of the tubes is a function of the speed, load and materials being dispensed.

Pump tubes which remain clamped in the pump will deform with time. Therefore, rotate the tube clip at the top of the pump to ‘open’ position in order to relieve the pressure whenever the pump is not being used for long periods or overnight.

13. Exclusion
If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired. This unit is NOT suitable for use in explosion hazard environments.

14. FAQ
Q. Why does the pump stalls or runs slower than expected when new tubing is installed?
A. The motor’s speed is controlled via the voltage supply to the motor. Too low voltage and the pump’s motor will stall, in particular when the tubing is new and the resulting load on the motor is higher. Please note that slow speed in continuous mode of operation will cause the motor temperature to rise.

Q. How can I dispense hot reagents using the dispenser?
A. Yes, the dispenser works safely with media temperatures of up to 100°C. Be aware that the internal electronics could be damaged by any ingress of fluids or steam vapours.

9. Clamping the peristaltic tube
The pump controller is delivered with a ID Ø3mm Santoprene tube. In order to reduce deformation caused by clamping the pressure lever is supplied in the open position.

Before use ensure you turn the lever down to the fully clamped position.

The pressure lever moves the pump cover towards the rollers and thus clamps the tube between the cover and the rollers.

10. Releasing the peristaltic tube when you have finished
Whenever the pump is not in use for long periods of time it is important to release the pressure off the tube. This will reduce the possibility of the tube’s permanent deformation and ensure that accuracy/precision is maximised.

Release the pressure by lifting the pressure lever.

11. Replacing the tube
For work in small volumes use the ID Ø1.0mm tube which is available as an accessory.

Lift the lever and remove the pump’s cover. Pull out both tube holders and remove from the cover. Replace with a new tube.

The easiest roller position for tube replacement is when one roller is at the top of the pump. You can turn the roller wheel with your fingers until you reach this positioning.

Chemical compatibility chart

<table>
<thead>
<tr>
<th>Acid/Alkali</th>
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<tbody>
<tr>
<td>Acetaldehyde</td>
<td>Chromic acid</td>
<td>Lignin oil</td>
<td>Potassium salts</td>
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<tr>
<td>Acetic acid</td>
<td>Chromic acid</td>
<td>Meganeos salt</td>
<td>Silver salts</td>
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<tr>
<td>Acetic Ammonide</td>
<td>Chromium salts</td>
<td>Methylene chloride</td>
<td>Soap solutions</td>
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<tr>
<td>Acrylic acid</td>
<td>Copper salts</td>
<td>Manganese salts</td>
<td>Sodium salts</td>
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<tr>
<td>Aluminum Chloride</td>
<td>Ethylene glycol</td>
<td>Mercury salts</td>
<td>Sodium hydrosilicate</td>
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<tr>
<td>Aluminum sulfate</td>
<td>Ferric salts</td>
<td>Manganese chloride</td>
<td>Sodium hypochlorite</td>
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<tr>
<td>Ammonia</td>
<td>Fluoroborate</td>
<td>Natural gas</td>
<td>Silica acid</td>
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<tr>
<td>Ammonium salts</td>
<td>Fluoroboric acid</td>
<td>Nickel salts</td>
<td>Sulfuric diode</td>
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<tr>
<td>Ammonium hydroxide</td>
<td>Fluoride acid</td>
<td>Nitric acid-10%</td>
<td>Sulfuric acid, dil.</td>
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<td>Analog amine</td>
<td>Formamidine</td>
<td>Nitrogen bases</td>
<td>Tannic acid</td>
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<td>Antimony salts</td>
<td>Formamide</td>
<td>Nitric acid</td>
<td>Tanning waxes</td>
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<td>Arsenic salts</td>
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<tr>
<td>Barium salts</td>
<td>Glucone</td>
<td>Oils, animal</td>
<td>Tannin photosynthetic</td>
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<tr>
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<td>Glycin</td>
<td>Oils, mineral</td>
<td>Tannin photosynthetic</td>
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<td>Bleaching liquor</td>
<td>Hydrochloric acid</td>
<td>Oils, vegetable</td>
<td>Tannin photosynthetic</td>
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<tr>
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<td>Hydrogen peroxide</td>
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<td>Phosphoric acid</td>
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Little or no effect on Santoprene

Acetone | Butane | Me Et Ketones | Skydrol 500-84

Acetone | Butanol | N-Hydrocarbons | Sulfuric acid-50%

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