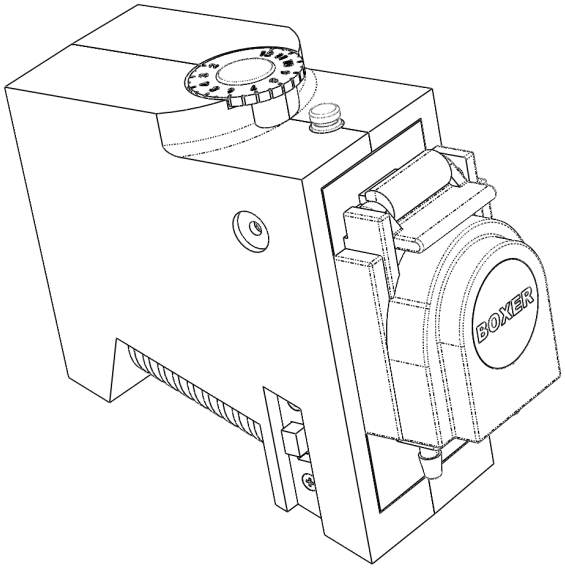
BOXER
9700+

Variable speed
dispensing pump

User Manual



Box contains

The following:
Boxer 9700 pump controller ····· Cat. No. 9700.000
PSU output 12V 0.5A with universal plug adapters ····· Cat. No. 6025
This instruction manual ····· Cat. No. 9700.6001
IDØ3.0 Santoprene tube (fitted into pump) ····· Cat. No. 9000.518

Accessories & spares:

Silicone Tubing IDØ1.0mm complete with connectors in PP ····· Cat.No.9000.504
Silicone Tubing IDØ2.0mm complete with connectors in PP ····· Cat.No.9000.505
Silicone Tubing IDØ3.0mm complete with connectors in Nylon ····· Cat.No.9000.510

Santoprene Tubing IDØ1.0mm complete with connectors in PP ····· Cat.No.9000.512
Santoprene Tubing IDØ2.0mm complete with connectors in PP ····· Cat.No.9000.513
Santoprene Tubing IDØ3.0mm complete with connectors in Nylon ·· Cat.No.9000.518

Santoprene tubing ID Ø1.00mm1meter running length ····· Cat.No.9000.511
Santoprene tubing ID Ø2.00mm1meter running length ····· Cat.No.9000.506
Santoprene tubing ID Ø3.00mm1meter running length ····· Cat.No.9000.515

Silicone tubing ID Ø1.00mm 1meter running length ····· Cat.No.9000.507
Silicone tubing ID Ø2.00mm 1meter running length ····· Cat.No.9000.509
Silicone tubing ID Ø3.00mm 1meter running length ····· Cat.No.9000.508

Set of 2 tube clips for running tube ID Ø1.00mm ····· Cat.No.9000.604
Set of 2 tube clips for running tube ID Ø2.00mm ····· Cat.No.9000.605
Set of 2 tube clips for running tube ID Ø3.00mm ····· Cat.No.9000.606

Foot Switch ····· Cat. No 6013

Product Specification:

Mains Voltage ····· 100V-240V 0.3A MAX 47-63Hz
Power Supply Unit output ····· +12VDC 0.5A
Environmental operating temp ····· +10°C to +40°C
Environmental storage temp ····· +4°C to +40°C

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It is the stated philosophy of Uno International Ltd to preserve the environment wherever possible. Uno International Ltd. will only use materials and production techniques that cause least environmental damage.

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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.

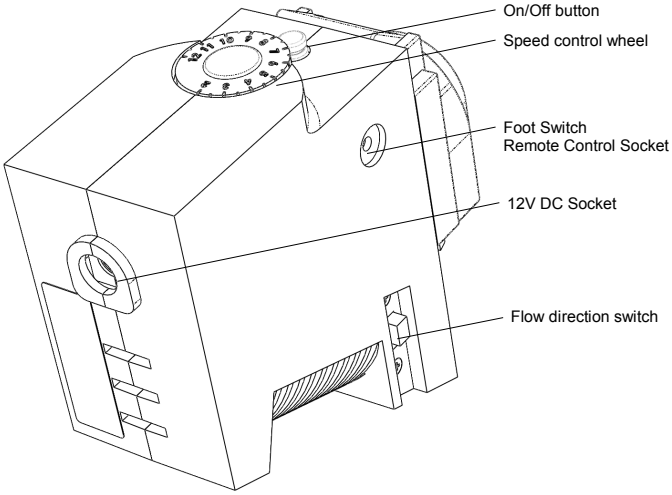
Unoverse 9100 pump controller ····· Cat. No.9700.000
Power supply unit ····· Cat. No.9100.004
ID3.0mm Santoprene tube (fitted) ····· Cat. No. 9000.518

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

The plug-in power supply unit is Switch Mode and automatically adjusts itself to the mains power supply characteristics. It will work with any mains voltage supply from 100V to 240V. The power supply unit is shipped with three alternative plug adaptors to fit European, American and UK power outlets. Select the correct adaptor for your needs and clip it into the power supply.



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).

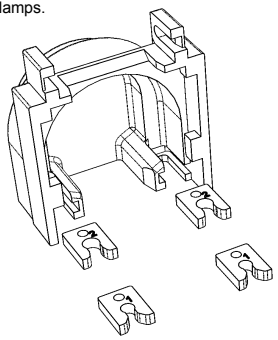
8. The choice of tubing

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.

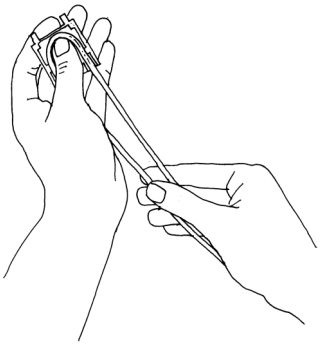
For fixed tube length you can choose between Silicone and Santoprene in 3 tube sizes. All tube options are listed under the Accessories heading.

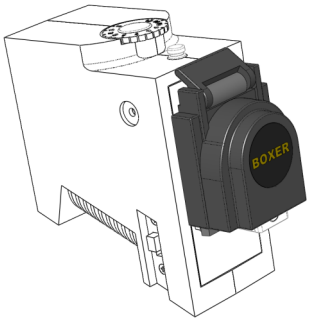
For the continuous tubing there are three sizes of clamps.

1. Marked '1' for ID1.0mm tube
2. Marked '2' for ID 2.0mm tube
3. Marked '3' for ID 3.0mm 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.





9. Clamping the peristaltic tube

The pump controller is delivered with a IDØ3mm Santoprene tube. In order to reduce deformation caused by clamping the pressure lever(1) 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

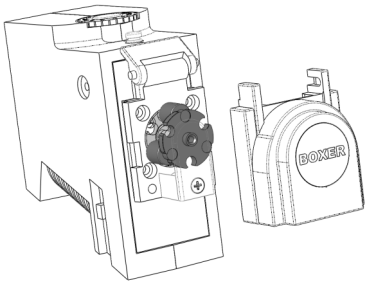
Whenever the pump is not in use for long periods of time it is important to release the pressure off the tube. This will reduce the possibility of the tube's permanent deformation and ensure that accuracy/ precision is maximised.

Release the pressure by lifting the pressure lever

11. Replacing the tube

For work in small volumes use the IDØ1.0mm 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.

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.

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

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

Check the peristaltic tubes weekly for signs of excessive wear and replace if required.

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. A new Santoprene tube is stiff when new so has to be shaped for some time before it gains it's elasticity. Run the pump in continuous mode for a total of approx 5 minutes with the clamp lever half open to start with, gradually moving the clamp lever to fully closed position.

Q. What is the life of the tube?
A. The life of a peristaltic tube depends on many variants such as speed, the reagent it is pumping and temperature. In general you should expect approximately 800 hours operation from one tube.

Q. Why can't I set slower dispense speed ?
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 operation will cause the motor temperature to rise.

Q. Can I dispense hot reagents using the dispenser?
A. Yes, the dispenser to 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.

Chemical compatibility chart

Little or no effect on Satoprene

Acetaldehyde	Chloroacetic acid	Linseed Oil	Potassium salts
Acetic acid	Chronic acid	Magnesium salt	Silver salts
Acetic Anhydride	Chromium salts	Maleic acid	Soap solutions
Acrylonitrile	Copper salts	Manganese salts	Sodium salts
Aluminum Chloride	Ethylene glycol	Mercury salts	Sodium hydroxide
Aluminum sulfate	Ferric salts	Methanol	Sodium hypo-chlorite
Ammonia	Fluoborate salts	Natural gas	Stearic acid
Ammonium salts	Fluoboric acid	Nickel salts	Sulfur dioxide
Ammonium hydroxide	Fluosilicic acid	Nitric acid-10%	Sulfuric acid, dil.
Amyl acetate	Formaldehyde	Nitroethane	Sulfurous acid
Antimony salts	Formamide	Nitrogen oxides	Tannic acid
Arsenic salts	Formic acid	Nitrous acid	Tanning extracts
Barium salts	Glucose	Oils, animal	Trisodium phos-phate
Benzoic acid	Glycerins	Oils. mineral	Urea
Bleaching liquor	Hydrochloric acid	Oils. vegetable	Uric acid
Boric acid	Hydrocyanic acid	Oxalic acid	Water
Bromine	Hydrogen peroxide	Oxygen	Water (brine)
Butyric acid	Hydrogen sulfide	Phosphoric acid	Water (stoam)
Calcium salts	Iodine and solutions	Phthalic acid	Zinc salts
Carbon Dioxide	Lactic acid	Phosphoric acid	
Chlorine (wet/dry)	Lead salts	Plating solutions	

Moderate

Acetates	Butane	Me Et Ketone	Skydrol 500-B4
Acetone	Butanol	Nitric acid-30%	Sulfuric acid-90%
Alcohols	Essential Oils	Nitrobenzene	Tetrahydrofuran
Amyl alcohol	Ethers	Oleic acid	Turpentine
Aniline	Ethanol	Phenol	
Benzaldehyde	Furfural	Propanol	
Benzyl alcohol	Lithium grease	Pyridine	

Severe

Benzene	Cyclohexane	Kerosene	Nitric acid- 70%
Carbon tetrachlo-ride	Ethyl chloride	Trichloroethylene	Perchloroethylene
Chlorobenzene	Freon	Lacquer	Toluene
Chloroform	Gasoline, unleaded	Naphtha	Xylene