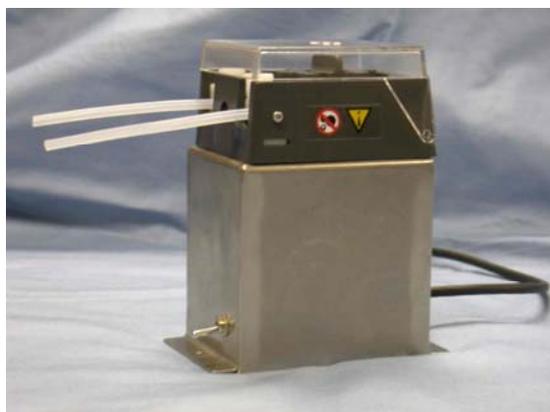


## Instruction Manual

Model 80204 Calibrate-able Liquid Pump  
with electronic brake for precision delivery.



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## Introduction

The Campden Instruments 80204 Liquid Pump a standard accessory for the Campden range of test chambers.

The pump uses a peristaltic head ensuring that the medium being pumped does not come into contact with any parts of the pump other than the tubing through which it being delivered. This has the advantage of zero contamination of medium. The rate of flow of the liquid is determined by the bore of the tubing within the pump and the type of tubing. Campden can supply a range of tubing in suitable materials to cope with a wide range of liquids. Tube life depends on the tube itself, the speed of pumping and the fluid being pumped.

The pump is capable of being fed a series of electrical pulses of known duration, in this way precise quantities of liquid can be dispensed.

## Operation

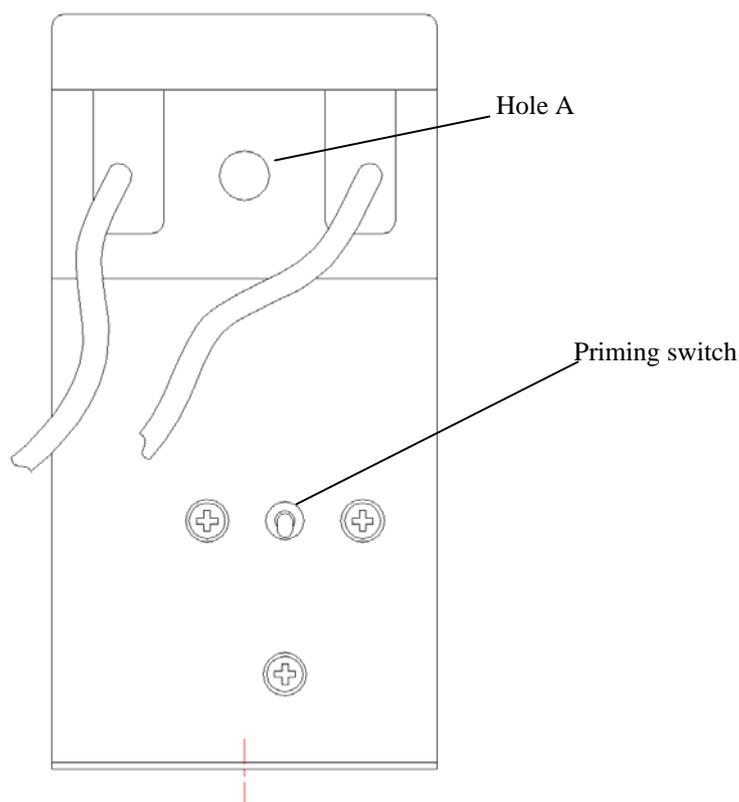
Connections to the pump are made via the 3 core cable.

Connections are as follows:

Red: 24/28V

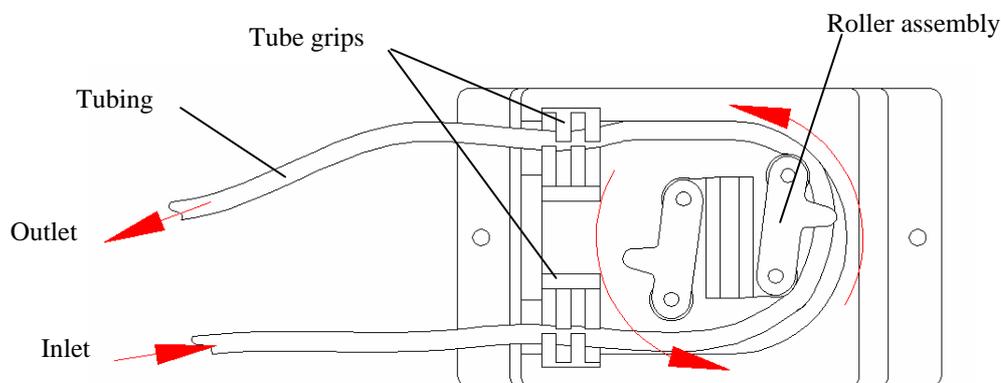
Blue: Operate

Green: 0V



**Figure 1. Front elevation of pump**

To operate the Pump, connect the unit as above. Fit a suitable length of tubing as shown in Figure 2. Connect the Operate terminal to 0v for >20mS. Release and reapply for the next dispense operation. The pump may also be operated continuously using the priming switch located on the front of the pump base. See the section below 'Calibration' for the method of determining the 'operate' pulse length.



**Figure 2. Plan view of pump head (cover removed)**

To load tubing, proceed as follows:

Open the inlet tube grip and insert a length of tubing between the jaws. Lay the tubing in the pump cavity and rotate the roller assembly so that it draws the tubing into the pressure rollers. Finally open the outlet tube grip and insert the tubing between the jaws. Ensure that the tubing is positioned approximately half way up the housing depth.

Tubing will eventually deteriorate or even split over a period of time so it is advisable that the tubing is replaced on a regular basis – experience will dictate a suitable interval.

## **Calibration**

Arrange for the pump to discharge a sample volume of liquid into a suitable container. The receiving container should be weighed accurately. Switch on the pump (preferably using the control system) for a known length of time until a suitable volume of liquid has been dispensed. Re-weigh the receiving vessel to calculate the volume of liquid that has been discharged. An accurate discharge rate can now be calculated. From this the volume/pulse can be derived. Arrange for the control system to pulse the pump on and off as required.

Please note that due to variations in tube size/material/quality and inconsistencies in fitting, the pump must be recalibrated whenever the tubing is changed or replaced.

Further details of specific control system aligned calibration procedures are contained in the appropriate control system manual.

## **Cleaning Procedure:**

Place the free end of the delivery tube in a reservoir (beaker or other suitable container) filled with clear water. Use the prime switch on the front of the pump or activate the yellow control line for several seconds until clear liquid flows from the end of the delivery pipe.

Please refer to the appropriate operator's booklet for the cleaning procedure for the Campden delivery trough, if you are using the Lafayette receptacle, the delivery pipe can be pulled up to clean and dry underneath it.

## Priming Procedure:

Prior to running an experiment, place the free end of the delivery tube in a reservoir (beaker or other suitable container) filled with the reward liquid such as 10% condensed milk, water, or other suitable solution.

Use the prime switch to advance the liquid through the tube until it reaches the end of the stainless delivery tube in the reward receptacle. Wipe away excess liquid if needed.

## Maintenance

For reliable operation the pump should be kept clean. If tubing splits and the pump becomes contaminated with liquid it should be cleaned as soon as possible.

The roller assembly can be removed by rotating the assembly until the securing screw can be seen through 'Hole A' (see figure 1). Loosen the screw and withdraw the roller assembly. Carefully clean the pump housing and roller assembly. Solvents must not be used.

Refit the roller assembly ensuring that the securing screw locates on the flat of the drive shaft. The roller assembly should be fitted so that it does not rub on the base of the housing – a gap of approximately 0.5mm should be maintained.

All electrical instruments and equipment should be periodically tested to ensure that they remain safe to use. In some countries this may be a statutory requirement. Your local Health and Safety Executive (or equivalent) will be able to advise on this matter.

The units contain no user-serviceable parts. Contact your dealer or Campden Instruments if you require assistance.

## Specifications

Voltage requirements:	24-28 VDC
Operating current:	<100mA
Standby current:	<10mA
Nominal rotation speed:	57 rpm
Nominal flow rates ( <i>for guidance only</i> ): (with 1.6mm thick wall silicone tubing and water @ 20°C)	0.5mm bore tube – 0.025 ml/sec 0.8mm bore tube – 0.06 ml/sec 1.6mm bore tube – 0.20 ml/sec

Users of Campden Instruments' BNC operant control software should also refer to page 17 of the manual for the recommended method of calibration.

## Part numbers:

80204	Liquid pump
80204-0.5	Replacement silicone tubing – 0.5 mm bore x 1.6 mm wall x 3 metre
80204-0.8	Replacement silicone tubing – 0.8 mm bore x 1.6 mm wall x 3 metre
80204-1.6	Replacement silicone tubing – 1.6 mm bore x 1.6 mm wall x 3 metre