

Pump P-910

Instructions

1 Introduction

Pump P-910 is a single channel peristaltic laboratory pump for use as a sample pump to fill sample loops in an ÄKTA™ design chromatography system. Pumping action is provided by a roller cage driven by a stepper motor controlled from a PC running UNICORN™ control system, version 2.10 or higher.

Features:

- Flow rates up to 5 ml/min.
- Accurate and reproducible flow rate.

Safety

WARNING! When using hazardous chemicals, all suitable protective measures, such as protective glasses, must be taken.

2 Installation

CAUTION! Before connecting Pump P-910 ensure the power is switched OFF at the pump or for the complete system.

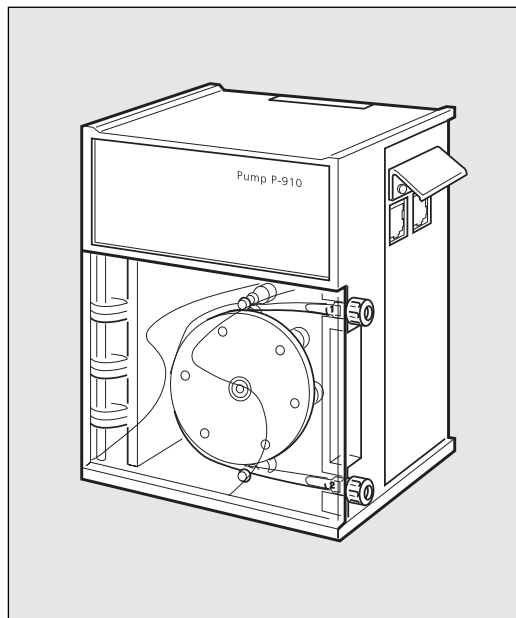
Unpacking

Unpack the instrument and check the items against the packing list. Inspect the items for obvious damage which may have occurred during transportation.

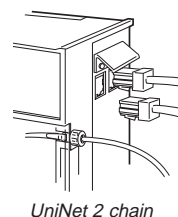
Installing the pump

At delivery, the pump is ready to use, with only the tubing to be installed.

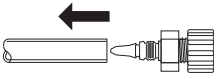
- 1 Mount the pump vertically, in the way it is shown in the user documentation of your ÄKTA design chromatography system.

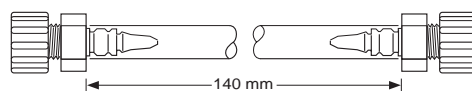


- 2 Connect the pump with two UniNet cables as a part of the *UnitNet 2* chain.



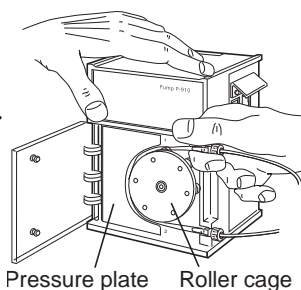
Assembling pump tubing

- 1 Cut the pump tubing squarely to length of 140 mm.
- 2 Insert one connector in each end of the tubing. 
- 3 The distance between the two connectors must be 140 mm. This ensures firm positioning of the tubing.



Inserting the tubing

- 1 Open the door.
- 2 Push back the pressure plate.
- 3 Insert the tubing. Make sure the nuts of the connectors fit correctly into the housing.

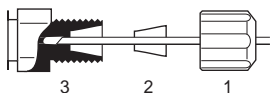


- 4 Close the door. The correct tubing pressure is set automatically.

Connecting the pump

Pump P-910 is connected to the system with 1/16" diameter PTFE or PEEK tubing, via the two connectors on the pump tubing.

Connect the outlet to the upper connector, marked 1, and the inlet to the lower connector, marked 2, as follows:



- 1 Cut the tube cleanly at a 45° angle.
- 2 Remove the connector nut (1) and slip it over the tubing.
- 3 Remove the sealing plug (2).
- 4 Push the tubing through the sealing plug until it protrudes about 1 cm.
- 5 Seat the tubing in the nipple (3). Slide the sealing plug along the tubing onto the nipple.
- 6 Fingertighten the connector nut.

3 Operation

Pump P-910 is controlled from a PC running UNICORN version 2.10 or higher. It cannot be used as a stand-alone instrument. Control of the pump can be achieved automatically from a method, or manually via the functions available in UNICORN.

Setting the flow rate

- 1 Select menu **System Control:Manual:Pump** in UNICORN.
- 2 Select the instruction **SampleFlow** in the list.
- 3 Enter the required flow rate.
- 4 Click on the **Execute** button. The pump starts.
- 5 To stop the pump, set the flow rate to 0.

The pump can be run without liquid, but it should be avoided due to mechanical wear.

Calibrating the pump

The pump must be calibrated every second day when in daily use or whenever the running conditions are changed, e.g. viscosity of sample or buffer, temperature, back-pressure, etc. If the pump is not used frequently it should be calibrated each time.

- 1 Select menu **System Control: System Calibrate** in UNICORN.
- 2 Select **SamplePump**.
- 3 Place the inlet tubing in a bottle of water.
- 4 Start the pump by selecting **Manual:Pump** and **Sampleflow**. Enter a suitable flow rate, e.g. 2 ml/min. Click on **Execute**.
- 5 Place the outlet tubing from the pump in a 10 ml measuring cylinder, at the same time pressing **Start collect** in the **Calibration** box.
- 6 Let the pump run for 2 min.
- 7 Press **Stop collect**, at the same time removing the outlet tubing from the measuring cylinder.

- 8 Measure the volume collected in the measuring cylinder. Enter this value in **Reference field**. Click on **Set ref value** then click on **Save**.
- 9 The pump is now calibrated.

Storage

Overnight: The pump can be left filled with a buffer.

Weekend and Long time storage: Flush the pump with water and then fill it with 20% Ethanol.

Note: If the pump tubing is left in the pump for a long period it will become deformed and will not function correctly.

For long time storage remove the pump tubing from the pump to avoid deformation of the tubing.

4 Maintenance

CAUTION! Only spare parts approved or supplied by Amersham Pharmacia Biotech may be used for maintaining and servicing Pump P-910.

<i>Period</i>	<i>Action</i>
If tubing breaks	Perform cleaning procedure detailed below.
Every 200 hrs	Replace pump tubing. See section 2.

Cleaning-in-place

Pump a cleaning or sanitizing agent through the pump. The standard recommendation is to pump 1 M NaOH for 30 minutes and then wash out with buffer.

WARNING! NaOH is injurious to health. Avoid spillage.

Cleaning procedure

- 1 Open the door and remove the tubing.
- 2 Dismantle the roller cage by undoing the Allen screw and lifting the cage straight out. Take care not to lose the two metal washers.
- 3 Slide the pressure plate forward and remove it from the pump.
- 4 Clean the roller cage and the roller cage housing with soapy water.
- 5 If the roller cage O-ring has come into contact with the eluent, replace the O-ring.
- 6 Re-assemble the pump by reversing the dismantling procedure.

5 Trouble shooting

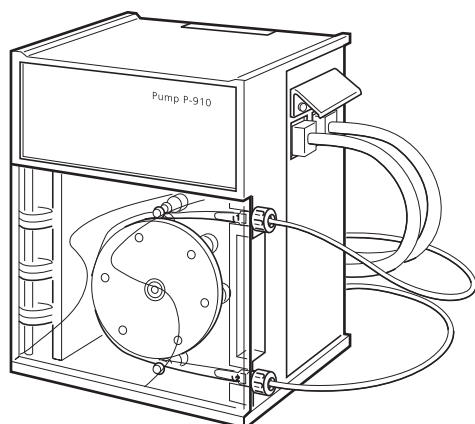
If the suggested actions do not correct the fault, call Amersham Pharmacia Biotech.

<i>Fault</i>	<i>Action</i>
Leakage	<ol style="list-style-type: none"> 1 Check the top and bottom pump tubing connections. 2 Check if there is damage to the pump tubing. Replace if necessary.
Not running	Check the UniNet connections.

Reference information

Description

A stepper motor in the pump housing drives a roller cage that provides the pumping action. The asymmetric pressure plate ensures the pump has a low pulsation characteristic. Control of the pump is provided from a PC running UNICORN, version 2.10 or higher. The power is supplied from a system pump in the ÄKTAdesign Pump P-900 series.



Roller cage

The roller cage contains six polytetrafluoroethylene pumping rollers mounted between two aluminium plates, which hold the roller bearings. As the cage rotates, the rollers rotate in the opposite direction, driven by drive wheels which engage the chassis ring.

The roller diameter and the gear ratio ensure that the rollers in contact with the pump tubing are stationary with respect to the tubing. Waves of compression pass along the tubing without dragging the tubing in the direction of movement of the roller cage.

Pressure plate

An asymmetric semi-circular formed plate presses the tubing against the rollers.

The correct pressure is automatically set by a ball and spring construction when the door is closed.

Pump tubing

The pump is delivered with 2.1 i.d. silicone pump tubing, enabling a flow rate up to 5 ml/min.

Technical specifications

Operating data

Flow rate range 0 - 5 ml/min
Pressure range 0 - 0.1 MPa (1 bar, 14 psi)
Flow rate accuracy

<±10% of setting or
 <±0,04 ml/min whichever is
 greatest

Flow rate reproducibility

<±4.0% or <±0,02 ml/min
 whichever is greatest

Environment

+4 to +40 °C
 20-95% relative humidity
 84-106 kPa (840-1060 mbar)
 atmospheric pressure

Physical data

Power requirement

32 V DC

Power consumption

Max. 8 W

Motor

Stepper motor

Inlet and outlet tubing

PTFE capillary tubing, 1/16" o.d.,
 0.75 mm i.d.

Degree of protection

IP 21

Wetted materials

Pump tubing

Silicone

pH stability range

1–13, 1–14 (<1 day exposure)

Chemical resistance

The silicone pump tubing is resistant to salt buffers and solutions commonly used in sample handling in liquid chromatography of biomolecules.

Dimensions,

H x W x D

138 x 112 x 90 mm

Weight

1.0 kg

EMC Standards

This product meets the requirement of the EMC Directive 89/336/EEC through the harmonized standards EN 50081-1 (emission) and EN 50082-1 (immunity)

Note: The declaration of conformity is valid for the instrument when it is

- used in laboratory locations
- used in the same state as it was delivered from Amersham Pharmacia Biotech except for alterations described in the user manual
- connected to other CE labelled Amersham Pharmacia Biotech instruments or other products as recommended.

Accessories and spare parts

<i>Item</i>	<i>Quantity per pack</i>	<i>Code no.</i>
Pump P-910, including pump tubing and one UniNet cable	1	18-1113-86
Pump tubing, i.d. 2.1 mm including 3 pump tubings and 2 tubing connectors		18-1115-65
Tubing, i.d. 2.1 mm	2	19-4691-01
UniNet cable, 0.7 m	1	18-1109-74
Roller cage complete	1	19-4616-01
O-ring	5	19-4653-01
Tubing connector	6	19-2150-01
Teflon tubing, i.d. 1/8", o.d. 3/16"	3 m	18-1112-47
Tubing connector for 3/16" o.d. tubing	10	18-1112-49
Ferrule for 3/16" o.d. tubing	10	18-1112-48
Stop plug, 5/16"	5	18-1112-50
Stop plug, 1/16"	5	18-1112-52
Union Luer female/1/16" male	2	18-1112-51
Union 1/16" female/M6 male	6	18-1112-57
Union M6 female/1/16" male	8	18-1112-58
PEEK tubing, i.d. 0.75 mm, o.d. 1/16"	2 m	18-1112-53
Teflon tubing, i.d. 0.75 mm, o.d. 1/16"	2 m	18-1112-54
PEEK tubing, i.d. 1.0 mm, o.d. 1/16"	2 m	18-1115-83
Fingertight connector 1/16"	10	18-1112-55

Important user information

WARNING!

The Warning sign is used to call attention to the necessity to follow an instruction in detail to avoid personal injury. Be sure not to proceed until the instructions are clearly understood and all stated conditions are met.

CAUTION!

The Caution sign is used to call attention to instructions or conditions that shall be followed to avoid damage to the product or other equipment. Be sure not to proceed until the instructions are clearly understood and all stated conditions are met.

Note

The Note sign is used to indicate information important for trouble-free or optimal use of the product.

Should you have any comments on this instruction, we will be pleased to receive them at:

Amersham Pharmacia Biotech AB
SE-751 84 Uppsala
Sweden

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Addresses

Amersham Pharmacia Biotech UK Limited
Amersham Place
Little Chalfont
Buckinghamshire
England HP7 9NA

Amersham Pharmacia Biotech AB
SE-751 84 Uppsala
Sweden

Amersham Pharmacia Biotech Inc
800 Centennial Avenue
PO Box 1327
Piscataway
NJ 08855 USA

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