Mixer M-925

Instructions

1 Introduction

Mixer M-925 is a dynamic, single chamber mixer with interchangeable mixer volumes. The mixer is used in stand-alone applications with ÄKTA™ design Pump P-900 series, in ÄKTAdesign chromatography systems and in Ettan™ liquid chromatography systems.

Features:

- 2-step mixing for optimum results.
- Flow rates up to 100 ml/min.s
- Interchangeable mixing chambers with volumes of 90 µl, 0.2, 0.6, 2, 5 or 12 ml.

1.1 Safety

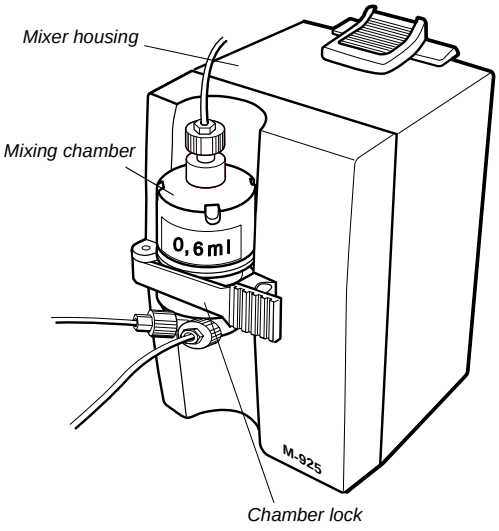
WARNING! When using hazardous chemicals, suitable protective measures, such as protective glasses, must be taken.

WARNING! Mixer M-925 with 12 ml chamber must not be used at pressures above 10 MPa (100 bar, 1450 psi). Mixer M-925 with 90 µl or 0.2 ml mixer chamber must not be used at pressures above 35 MPa (350 bar, 5075 psi)

2 Installation

2.1 Unpacking

CAUTION! Before connecting the Mixer M-925 ensure the power is switched OFF at the system pump or the complete system.



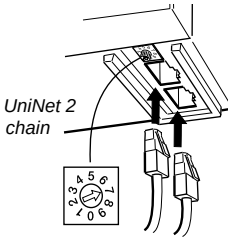
Unpack the mixer and check the items against the packing list. Inspect the items for obvious damage which may have occurred during transportation.

2.2 Installing the mixer

CAUTION! Do not install the mixer closer than 0.5 m from any computer display. The rotating stirrer may disturb the display screen.

The mixer and the mixer chamber(s) are delivered in separate packages, and must be assembled before use.

1 Connect the mixer with two UniNet cables (or a termination plug) as a part of the UniNet 2 chain.



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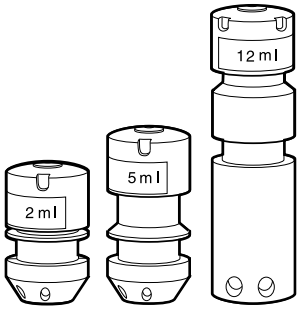
2 Mount the mixer in an ÄKTAdesign or an Ettan liquid chromatography system, or together with an ÄKTAdesign P-900 series system pump in stand-alone applications. See the user documentation for further information.

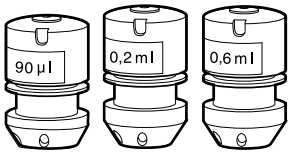
3 Fit a mixer chamber to the mixer housing as described below.

2.3 Fitting mixing chamber

WARNING! When using hazardous chemicals, ensure that the mixer chamber has been flushed through with distilled water before removing an used chamber.

A mixer chamber must be fitted to the mixer housing prior to use.





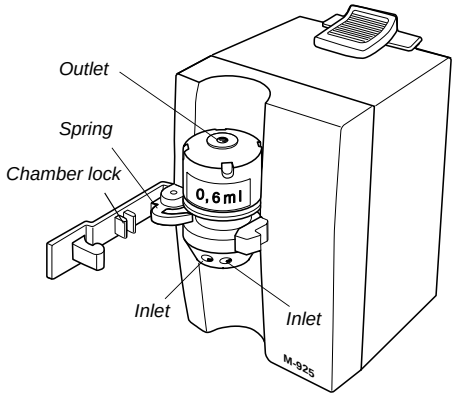
Mixer chambers of 90 µl, 0.2, 0.6, 2, 5 and 12 ml are available.

Recommended flow rates for each mixing chamber are specified in the table below.

When using eluents that are more difficult to mix such as isopropanol and water, a large mixer volume can be used to get optimum mixing

Mixing chamber volume and max. pressure	*Recommended flow rates (ml/min)* *Two pump gradients*	*Switch valve gradients*
90 µl/35 MPa	0.0025–2.0	–
0.2 ml/35 MPa	0.0025–5.0	–
0.6 ml/25 MPa	0.001–10.0	0.1-5
2 ml/25 MPa	0.5–100	1-10
5 ml/25 MPa	5–100	5-30
12 ml/10 MPa	–	15-100

Note: *For BufferPrep select flow rates as for switch valve gradients.*

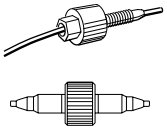


To fit a mixer chamber:

1 Open the plastic lock covering the mixer chamber compartment. A spring is securing the mixer chamber in position when the lock is opened.

2 Insert a mixer chamber, and close the lock.

3 Fit the inlet and outlet tubing. Use Fingertight connectors, or a Union male/male, according to the recommendations in the system documentation.



3 Operation

The mixer is controlled from a system pump in the ÄKTAdesign P-900 series or from P-905 in an Ettan liquid chromatography system and is, by default, operating whenever the pump is running. See the User Manual for the pump.

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

3.1 Storage

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

Overnight and long term storage: Flush the mixer with water and then fill with 20% ethanol.

4 Maintenance

CAUTION! Only spare parts approved or supplied by Amersham Biosciences may be used for maintaining and servicing Mixer M-925.

4.1 Periodic maintenance

Period	*Action*
Every 6 months	General inspection
Every 2nd year	Replace the mixer chamber

4.2 Cleaning-in-place

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

WARNING! NaOH is injurious to health. Avoid spillage.

4.3 General inspection

1 Check that the mixer chamber is clean and without damage. Check the tubing connectors. Replace if required.

4.4 Replacing mixer chamber

WARNING! When using hazardous chemicals, ensure that the mixer chamber has been flushed through with distilled water before removing an used chamber.

1 Make sure the pump is stopped.

2 Place the buffer bottles lower than the mixer to prevent draining, and then remove the inlet and outlet tubing.

3 Open the plastic lock holding the mixer chamber. A spring is securing the mixer chamber in position when the lock is opened.

4 Pull out the mixer chamber gently.

5 Insert the new mixer chamber, and close the lock.

6 Replace the inlet and outlet tubing.

5 Trouble-shooting

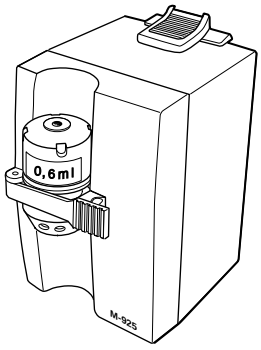
If the suggested actions do not correct the fault, call Amersham Biosciences.

Fault	*Action*
Leakage	1 Check the tubing and connectors. If leakage is located to the mixer chamber, replace the complete chamber.
Waves on the gradient	
	1 Check that the pump is operating and is programmed correctly.
	2 Clean the mixing chamber to make sure it is free of dirt or particles.
	3 Change to a larger mixing chamber volume if necessary.
Unlinear gradients or slow response to %B changes	
	1 Check that the tubing has been washed properly and that the pump is operating.
	2 Change to a smaller mixer volume.
Not running	1 Check cables.
	2 Check Setup Mixer menu on the pump.
Other faults	Contact Amersham Biosciences.

6 Reference information

6.1 Description

A mixer motor inside the housing spins a magnet at 600 rpm, that causes the stirrer in the mixing chamber to rotate.

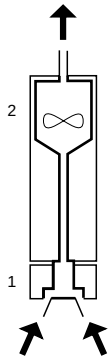


The eluents are mixed in two steps:

1 Premixing in a static mixer with a small volume (22 µl).

2 Dynamic mixing chamber with rotating stirrer.

The mixer housing and the mixer chamber contains no user replaceable items.



6.2 Technical specifications

Operating data

Max. flow rate	0.001-100 ml/min
Max. pressure	
12 ml chamber	10 MPa at 0.1-100 ml/min (100 bar, 1450 psi)
0.6, 2 and 5 ml chambers	25 MPa at 0.001-100 ml/min (250 bar, 3625 psi)
90 µl and 0.2 ml chambers	35 MPa at 0.001-5 ml/min (350 bar, 5075 psi)
pH range	1–13, 1–14 (<1 day exposure)
Viscosity	Max. 5 cP
Environment	+4 to +40 °C 20-95% relative humidity 84-106 kPa (840-1060 mbar) atmospheric pressure

Physical data

Internal volume	6 interchangeable mixing chambers: 90 µl, 0.2, 0.6, 2, 5 and 12 ml
Mixing principle	1 static chamber and 1 dynamic chamber
Degree of protection	IP 43
Wetted materials	
Stirrer	PTFE (polytetrafluorethylene)
Mixing chambers	PEEK (polyetheretherketone)
Chemical resistance	The wetted parts are resistant to organic solvents and salt buffers commonly used in chromatography of biomolecules, except 100% ethyl acetate, 100% hexane and 100% tetrahydrofuran (THF)
pH stability range	1–13, 1–14 (<1 day exposure)
Power requirement	12–40 V DC from the pump
Power consumption	1 W
Inlet and outlet tubing	UNF 10–32 thread profile, e.g. "Fingertights" for capillary tubing 1/16" outer diameter
Dimensions,	
H × *W* × *D*	152 × 77 × 111 mm
Weight	1.2 kg

6.3 Accessories and spare parts

Item	*Quantity per pack*	*Code no.*
Mixer M-925 including one UniNet cable	1	18-1118-89
Cable UniNet, 0.7 m	1	18-1109-74
Mixing chamber (must be ordered separately)		
90 µl	1	18-1147-24
0.2 ml	1	18-1147-21
0.6 ml	1	18-1118-90
2 ml	1	18-1118-91
5 ml	1	18-1118-92
12 ml	1	18-1118-93
Stop plug, 1/16"	5	18-1112-52
Fingertight connector, PEEK, for i.d. 1/16" tubing	10	18-1112-55
Sleeve for 18-1147-10, PEEK, o.d. 1/16", i.d. 305 µm	10	18-1156-63
Sleeve for 18-1147-10, for capillary with i.d. 0.10 mm	10	18-1147-11
Sleeve for 18-1147-10, for capillary with i.d. 0.15 mm	10	18-1147-12
Union, 1/16" male/ 1/16" male, i.d. 0.25 mm	2	18-1120-92
Union, 1/16" male/ 1/16" male, i.d. 0.13 mm	2	18-1120-90

Important user information

All users must read this entire manual to fully understand the safe use of Mixer M-925.

WARNING!

The WARNING! sign highlights instructions that must be followed to avoid personal injury. It is important not to proceed until all stated conditions are met and clearly understood.

Caution!

The Caution! sign highlights instructions that must be followed to avoid damage to the product or other equipment. It is important not to proceed until all stated conditions are met and clearly understood.

Note

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

Declaration of conformity

Safety standards

This product meets the requirements of the Low Voltage Directive 73/23/EEC through the harmonized standard EN 61 010-1:1993 + A2:1995.

EMC standards

This product meets the requirements of the EMC Directive 89/336/EEC through the harmonized standard EN 61 326-1:1997 + A1:1998.

The **CE** symbol and corresponding declaration of conformity, is valid for the instrument when it is:

- connected to other CE-marked Amersham Biosciences instruments, or
- connected to other products recommended or described in this manual, and
- used in the same state as it was delivered from Amersham Biosciences except for alterations described in this manual.

WARNING!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Terms and Conditions of Sale

All goods and services are sold subject to the terms and conditions of sale of the company within the Amersham Biosciences group which supplies them. A copy of these terms and conditions is available on request.

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

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