

GE Healthcare

Mixer M-925

Instructions



Important user information

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

Important!

Mixer M-925 is intended for research use only, and should not be used in any clinical or in vitro procedures for diagnostic purposes.

Safety notices

This manual contains warnings and cautions concerning the safe use of the product. See definitions below.

WARNING!



WARNING! The WARNING symbol and notice highlight instructions that must be followed to avoid personal injury. Do not proceed until all stated conditions are clearly understood and met.

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

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

Recycling



This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

WARNING!



WARNING! This is a Class A product. In a domestic environment, it might cause radio interference, in which case the user might be required to take appropriate measures.

WARNING!



WARNING! All repairs should be done by personnel authorized by GE Healthcare. Do not open any covers or replace parts unless specifically stated in the instructions.

CE Certification

This product complies with the European directives listed below, by fulfilling corresponding harmonized standards. A copy of the Declaration of Conformity is available on request.

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

- used as a stand-alone unit, or
- connected to other CE-marked GE Healthcare instruments, or
- connected to other products recommended or described in this manual, and
- used in the same state as it was delivered from GE Healthcare except for alterations described in this manual.

Note: The Declaration of conformity is valid only for systems that are marked with the CE logo:



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1 Introduction

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

Features:

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

1.1 Safety

IMPORTANT! Mixer M-925 is intended for laboratory use only, not for clinical or *in vitro* use, or for diagnostic purposes.



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)



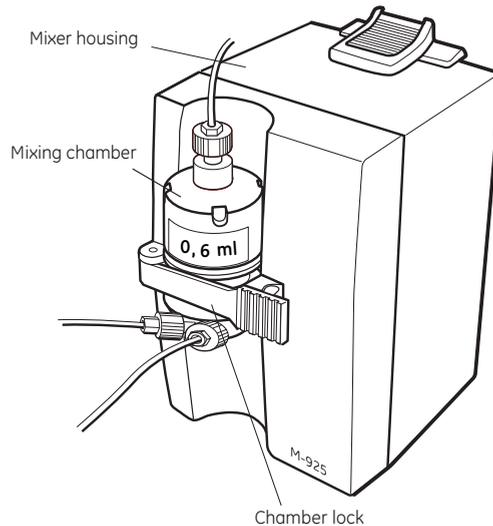
WARNING! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.

1 Introduction

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.



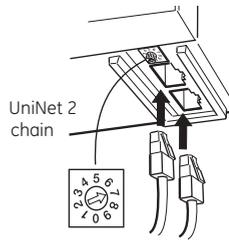
WARNING! Only use mains cables delivered or approved by GE Healthcare.



WARNING! Do not block the rear panel of the system. The mains power switch must always be easy to access.

2 Installation

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



- 2 Mount the mixer in an ÄKTAdesign 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.

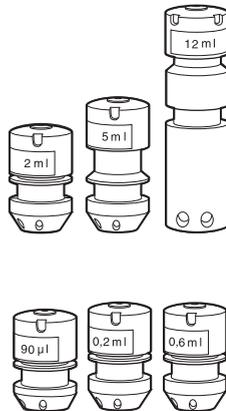
2.3 Fitting mixing chamber



WARNING! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.

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.

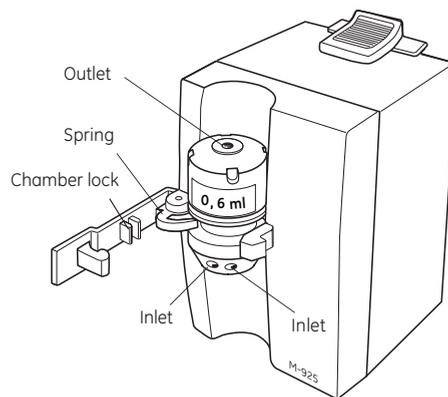


Recommended flow rates for each mixing chamber are specified in the table below.

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.

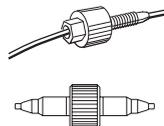
Mixing chamber volume and max. pressure	Recommended flow rates (ml/min)	
	Two pump gradients	Switch valve gradients
90 µl/35 MPa	0.0025–2.0	–
0.2 ml/35 MPa	0.0025–5.0	–
0.6 ml/25 MPa	0.001–10.0	0.1–5
2 ml/25 MPa	0.5–100	1–10
5 ml/25 MPa	5–100	5–30
12 ml/10 MPa	–	15–100

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.



2 Installation

3 Operation

The mixer is controlled from a system pump in the ÄKTAdesign P-900 series 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.



WARNING! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.

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.

3 Operation

4 Maintenance

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

4.1 Periodic maintenance



WARNING! Remove liquid or dirt from the system surface using a cloth and, if necessary, a mild cleaning agent.



WARNING! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.



WARNING! When using hazardous chemicals, make sure that the entire system has been flushed thoroughly with bacteriostatic solution, for example NaOH, and distilled water before service and 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! When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.



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, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the chemicals used. Follow local regulations and instructions for safe operation and maintenance of the system.

- 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 Troubleshooting

If the suggested actions do not correct the fault, call GE Healthcare.

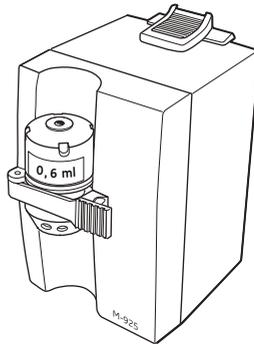
Fault	Action
Leakage	1 Check the tubing and connectors. If leakage is located to the mixer chamber, replace the complete chamber.
Waves on the gradient	1 Check that the pump is operating and is programmed correctly. 2 Clean the mixing chamber to make sure it is free of dirt or particles. 3 Change to 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 GE Healthcare.

5 Troubleshooting

6 Reference information

6.1 Description

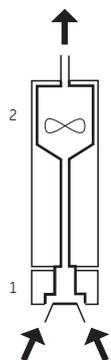
A mixer motor inside the housing spins a magnet at 600 rpm, that causes the stirrer in the mixing chamber to rotate.



The eluents are mixed in two steps:

- 1 Premixing in a static mixer with a small volume (22 μ l).
- 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 to 100 ml/min
Max. pressure	
12 ml chamber	10 MPa at 0.1 to 100 ml/min (100 bar, 1450 psi)
0.6, 2 and 5 ml chambers	25 MPa at 0.001 to 100 ml/min (250 bar, 3625 psi)
90 µl and 0.2 ml chambers	35 MPa at 0.001 to 5 ml/min (350 bar, 5075 psi)
pH range	1 to 13, 1 to 14 (<1 day exposure)
Viscosity	Max. 5 cP
Environment	+4 to +40 °C 20 to 95% relative humidity 84 to 106 kPa (840 to 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 to 13, 1 to 14 (<1 day exposure)
Power requirement	12 to 40 V DC from the pump
Power consumption	1 W
Inlet and outlet tubing	UNF 10 to 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
Compliance with standards	The declaration of conformity is valid for the instrument only if it is: <ul style="list-style-type: none"> • used in laboratory locations • used in the same state as it was delivered from GE Healthcare except for alterations described in the User Manual • connected to other CE labelled GE Healthcare modules or other products as recommended.

Safety standards	<p>This product meets the requirement of the Low Voltage Directive (LVD) 2006/95/EC through the following harmonized standards:</p> <ul style="list-style-type: none">• EN61010-1• IEC 61010-1• CAN/CSA-C22.2 No. 61010-1• UL61010-1
EMC standards	<p>This device meets the requirements of the EMC Directive 2004/108/EC through the following harmonized standards:</p> <ul style="list-style-type: none">• EN 61326 (emission and immunity)• EN 55011, GR 2, Class A (emission)• This device complies with part 15 of the FCC rules (emission). Operation is subject to the following two conditions:<ol style="list-style-type: none">1 This device may not cause harmful interference.2 This device must accept any interference received, including interference that may cause undesired operation.

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

6.4 Recycling



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For local office contact information, visit
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