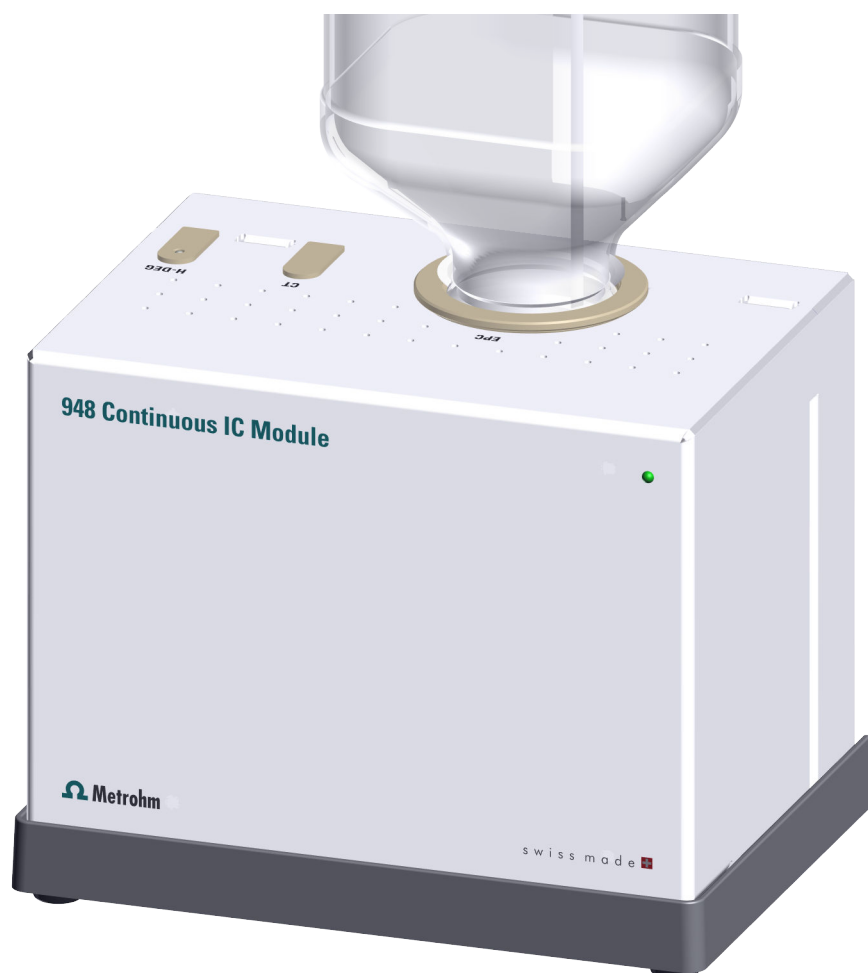


948 Continuous IC Module



2.948.00x0

Manual

8.0948.8001EN / v8 / 2026-02-23



Metrohm AG
CH-9100 Herisau
Switzerland
+41 71 353 85 85
info@metrohm.com
www.metrohm.com

948 Continuous IC Module

2.948.00x0

Manual

Technical Communication
Metrohm AG
CH-9100 Herisau

This documentation is protected by copyright. All rights reserved.

This documentation is an original document.

This documentation has been prepared with great care. However, errors can never be entirely ruled out. Please send comments regarding possible errors to the address above.

Disclaimer

Deficiencies arising from circumstances that are not the responsibility of Metrohm, such as improper storage or improper use, etc., are expressly excluded from the warranty. Unauthorized modifications to the product (e.g., conversions or attachments) exclude any liability on the part of the manufacturer for resulting damage and its consequences. Instructions and notes in the Metrohm product documentation must be strictly followed. Otherwise, Metrohm's liability is excluded.

Table of contents

1	Introduction	1
1.1	Instrument description	1
1.2	Product versions	1
1.3	About the documentation	2
1.3.1	Symbols and conventions	2
1.4	Displaying accessories	3
2	Safety	5
2.1	Intended use	5
2.2	Responsibility of the operator	6
2.3	Requirements for operating personnel	6
2.4	Safety instructions	7
2.4.1	General notes on safety	7
2.4.2	Electrical safety	7
2.4.3	Tubing and capillary connections	8
2.4.4	Flammable solvents and chemicals	8
2.4.5	Recycling and disposal	8
3	Overview of the device	10
3.1	948 Continuous IC Module	10
3.1.1	Functional description	10
3.1.2	Overview	10
3.1.3	Signal status display	15
3.2	Eluent Producer cartridge (EPC)	16
3.2.1	Functional description	16
3.2.2	Overview	19
3.3	Continuous Trap (CT)	20
3.3.1	Functional description	20
3.3.2	Overview	22
3.4	High-pressure degasser (H-DEG)	23
3.4.1	Functional description	23
3.4.2	Overview	25
4	Installation	26
4.1	Setting up the device	26
4.1.1	Packaging	26
4.1.2	Checks	26
4.1.3	Setup location	26
4.2	Setup configurations	27



Index

70



Table of figures

Figure 1	948 Continuous IC Module – Front	11
Figure 2	948 Continuous IC Module – Rear open	11
Figure 3	948 Continuous IC Module with accessories – Front	12
Figure 4	948 Continuous IC Module with accessories – Rear closed	13
Figure 5	948 Continuous IC Module with accessories – Rear open	14
Figure 6	Sockets for cable connections	15
Figure 7	Eluent Producer cartridge – Function	17
Figure 8	Eluent Producer cartridge – Overview	19
Figure 9	Continuous trap – Function	21
Figure 10	Continuous trap – Functional diagram	21
Figure 11	Continuous trap – Overview	22
Figure 12	High-pressure degasser – Function	23
Figure 13	Degasser tubing at the rear of the high-pressure degasser	24
Figure 14	High-pressure degasser – Overview	25
Figure 15	Bottle holder with 948 Continuous IC Module and bottles	28
Figure 16	Tubing connection with flangeless fitting	32
Figure 17	948 Continuous IC Module with conductivity detection and SeS – Flow path with STREAM	34
Figure 18	948 Continuous IC Module with conductivity detection and SeS – Flow path with external rinsing	35
Figure 19	Equilibrating the continuous trap – Flow path	40
Figure 20	Mounting the guide clips	44

1 Introduction

1.1 Instrument description

The **948 Continuous IC Module** is a device for the automatic manufacture of eluents for ion chromatography. Isocratic eluents can be produced and gradients can be run.

The 948 Continuous IC Module is operated using the **MagIC Net** software. It is connected via a USB cable to a computer on which MagIC Net is installed. The software detects the instrument automatically and checks its functionality. MagIC Net controls and monitors the instrument and manages the data in a database.

Additional information on operating MagIC Net can be found in the document "*MagIC Net Tutorial*" or in the software's online help.

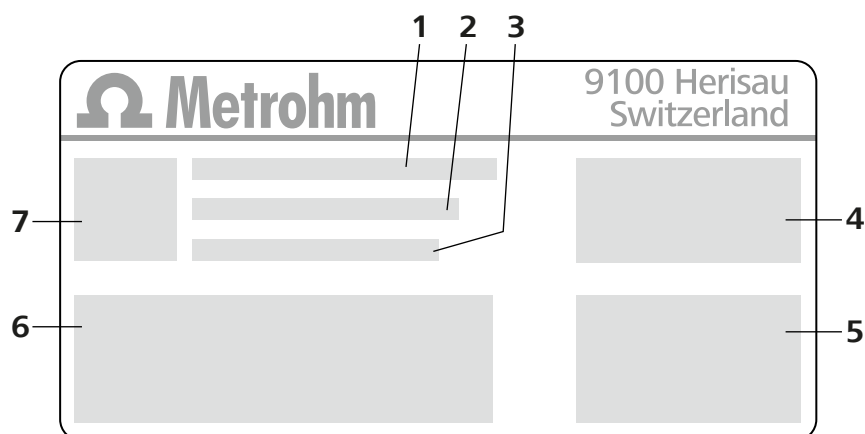
1.2 Product versions

The 948 Continuous IC Module is available in the following versions:

Table 1 Product versions

Art. no.	Designation	Version feature
2.948.0010	948 Continuous IC Module, CEP	Continuous eluent production

The article number and serial number for identifying the product can be found on the type label.



1 (01) = Article number in accordance with GS1 standard

2 (21) = Serial number



3	(240) = Metrohm article number	4	Certification
5	Technical specifications	6	Certification
7	QR code		



NOTE

Accessories information for the respective product version can be obtained either on the Internet at <http://www.metrohm.com> or from your regional Metrohm representative.

1.3 About the documentation



CAUTION

Read through this documentation carefully before putting the device into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the device.

1.3.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

(5-12)	Cross-reference to figure legend The first number refers to the figure number, the second to the instrument part in the figure.
1	Instruction step Perform the steps one after the other.
Method	Dialog text, parameter in the software
File ► New	Menu or menu item
[Continue]	Button or key
	WARNING This symbol draws attention to a possible life-threatening hazard or risk of injury.
	WARNING This symbol draws attention to a possible hazard due to electrical current.

**WARNING**

This symbol draws attention to a possible hazard due to heat or hot instrument parts.

**WARNING**

This symbol draws attention to a possible biological hazard.

**WARNING**

Warning of optical radiation

**CAUTION**

This symbol draws attention to possible damage to instruments or instrument parts.


**NOTICE**

This symbol highlights additional information and tips.

1.4 Displaying accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website.

1 Searching for a product on the website

- Go to <https://www.metrohm.com>.
- Click on .
- Enter the article number of the product (e.g. **2.1001.0010**) into the search field and press **[Enter]**.

The search result is displayed.

2 Displaying product information

- To display the products matching the search term, click on **Product models**.
- Click on the desired product.

Detailed information regarding the product is displayed.

3 Displaying accessories and downloading the accessories list

- To display the accessories, scroll down to **Accessories and more**.
 - The **scope of delivery** is displayed.
 - Click on **[Optional parts]** for the optional accessories.



- To download the accessories list, click on **[Download accessories PDF]** under **Accessories and more**.



NOTE

Metrohm recommends keeping the accessories list for reference purposes.

2 Safety

2.1 Intended use

The 948 Continuous IC Module is used for the automated manufacture of potassium hydroxide eluents from 4 mol/L potassium hydroxide.

The following specifications must be observed:

- Flow rate: 0.1–3.0 mL/min
- Pressure: Max. 21 MPa
- Solvent: Max. 25% methanol
- Concentration: 0.1–100 mM

The 948 Continuous IC Module is suitable for processing chemicals. Therefore, the use of the 948 Continuous IC Module requires the user to have basic knowledge and experience in handling toxic and caustic substances. Knowledge regarding the application of fire prevention measures prescribed for laboratories is also mandatory.

Adherence to this technical documentation and compliance with the maintenance specifications make up an important part of intended use.

Any utilization in excess of, or deviating from, the intended use is regarded as misuse.

Specifications regarding the operating values and limit values of individual products are contained in the "Technical specifications" section, if relevant. Exceeding and/or not observing the mentioned limit values during operation puts people and components at risk. The manufacturer assumes no liability for damage due to non-observance of these limit values.

The EU declaration of conformity loses its validity as soon as modifications are carried out on the products and/or the components.

2.4 Safety instructions

2.4.1 General notes on safety



WARNING

Operate this instrument only according to the information contained in this documentation.

This instrument left the factory in a flawless state in terms of technical safety. To maintain this state and ensure non-hazardous operation of the instrument, the following instructions must be observed carefully.

2.4.2 Electrical safety

The electrical safety when working with the instrument is ensured as part of the international standard IEC 61010.



WARNING

Only personnel qualified by Metrohm are authorized to carry out service work on electronic components.



WARNING

Never open the housing of the instrument. The instrument could be damaged by this. There is also a risk of serious injury if live components are touched.

There are no parts inside the housing which can be serviced or replaced by the user.

Supply voltage



WARNING

An incorrect supply voltage can damage the instrument.

Only operate this instrument with a supply voltage specified for it (see rear panel of the instrument).

Protection against electrostatic charges



WARNING

Electronic components are sensitive to electrostatic charges and can be destroyed by discharges.

Do not fail to pull the power cord out of the power socket before you set up or disconnect electrical plug connections at the rear of the instrument.

2.4.3 Tubing and capillary connections



CAUTION

Leaks in tubing and capillary connections are a safety risk. Tighten all connections well by hand. Avoid applying excessive force to tubing connections. Damaged tubing ends lead to leakage. Appropriate tools can be used to loosen connections.

Check the connections regularly for leakage. If the instrument is used mainly in unattended operation, then weekly inspections are mandatory.

2.4.4 Flammable solvents and chemicals

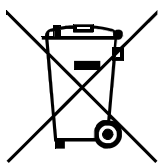


WARNING

All relevant safety measures are to be observed when working with flammable solvents and chemicals.

- Set up the instrument in a well-ventilated location (e.g. fume cupboard).
- Keep all sources of flame far from the workplace.
- Clean up spilled liquids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.

2.4.5 Recycling and disposal



This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old instrument will help to prevent negative effects on the environment and public health.

More details about the disposal of your old instrument can be obtained from your local authorities, from waste disposal companies or from your local dealer.



Figure 1 948 Continuous IC Module – Front

- 1 Status display**
(see chapter 3.1.3, page 15)

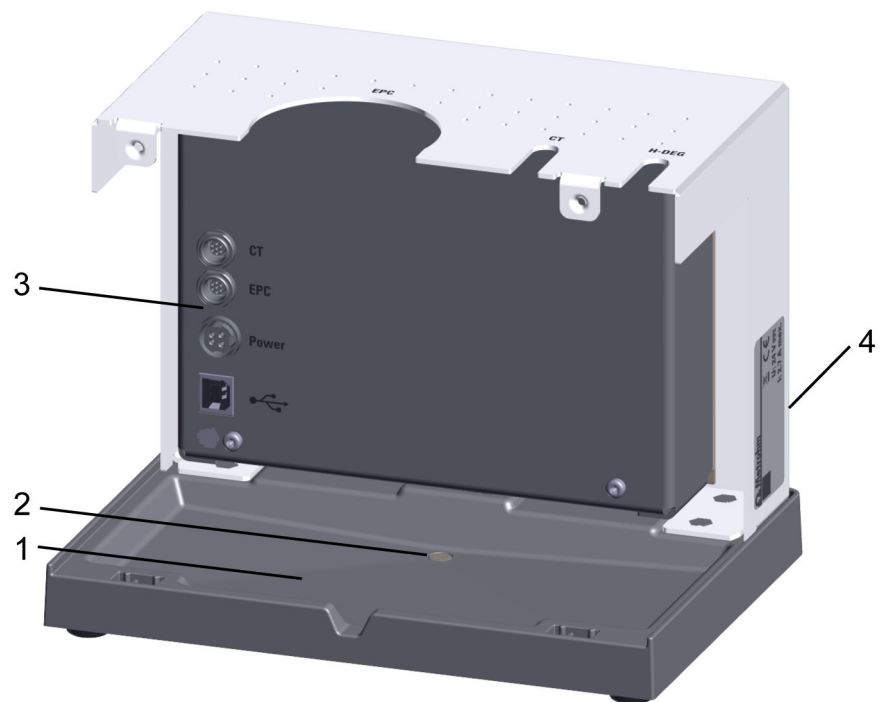


Figure 2 948 Continuous IC Module – Rear open

- 1 Base tray**

- 2 Leak sensor**

- 3 Sockets for cable connections**
(see figure 6, page 15)

- 4 Type label**
(see chapter 1.2, page 1)

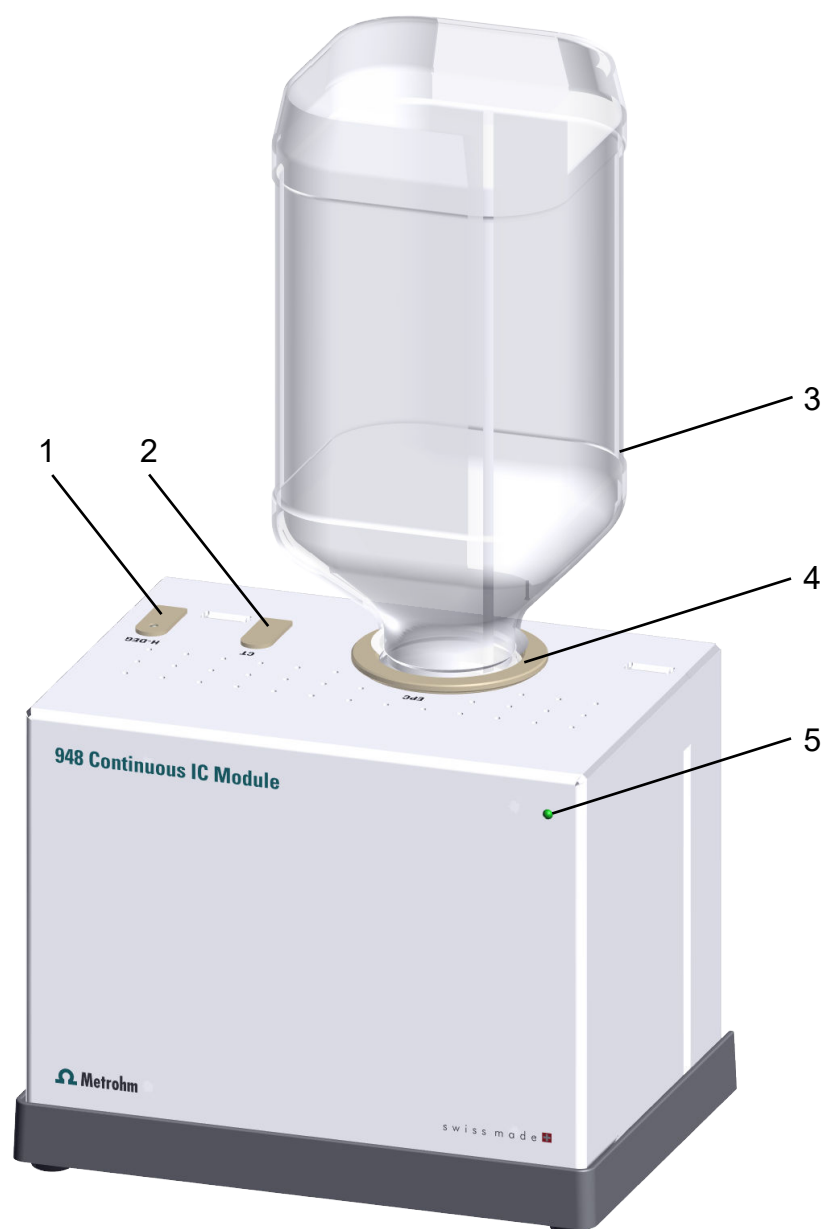


Figure 3 948 Continuous IC Module with accessories – Front

1	High-pressure degasser (H-DEG) 6.02850.000	2	Continuous Trap (CT) 6.02850.1x0
3	Concentrate bottle	4	Eluent Producer cartridge (EPC) 6.02850.2x0
5	Status display (see chapter 3.1.3, page 15)		

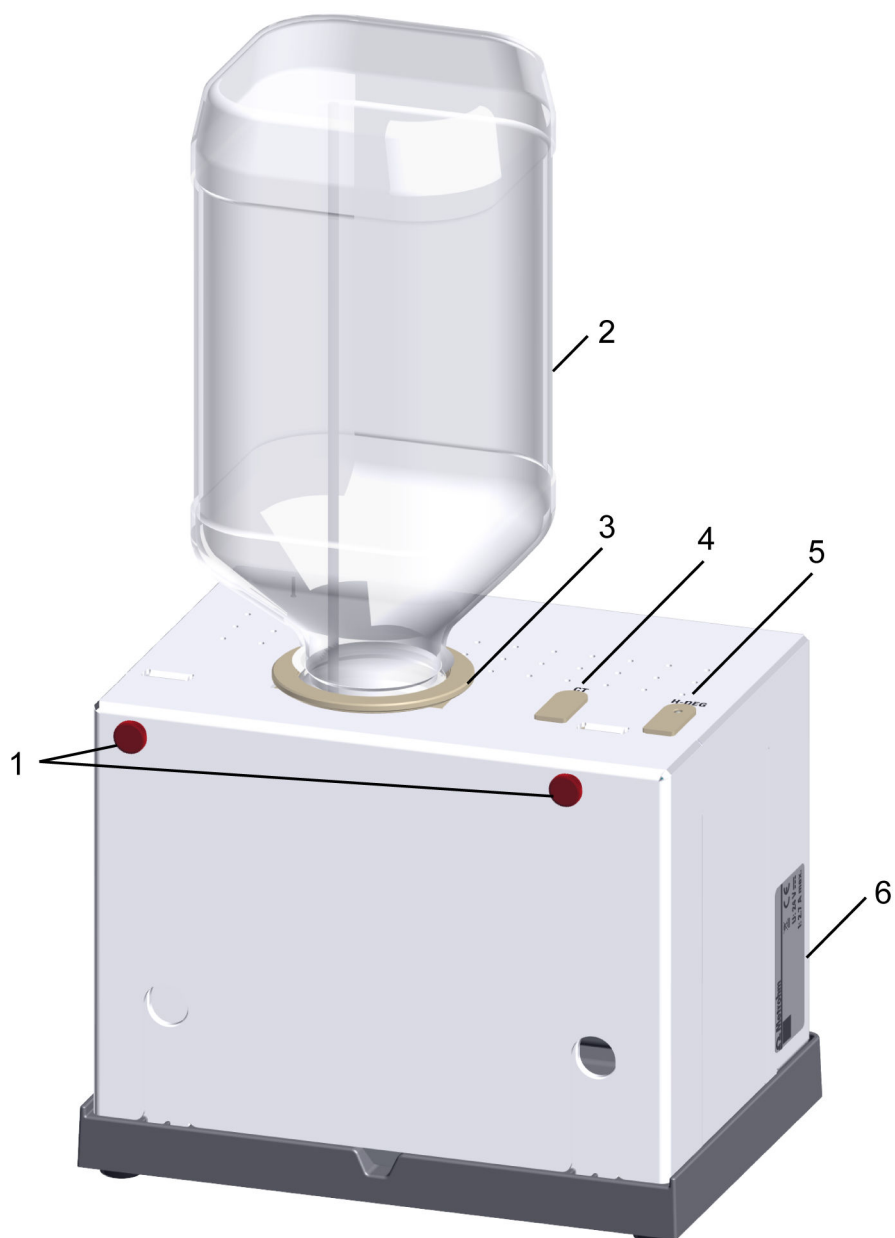


Figure 4 948 Continuous IC Module with accessories – Rear closed

1	Knurled screws	2	Concentrate bottle
3	Eluent Producer cartridge (EPC) 6.02850.2x0	4	Continuous Trap (CT) 6.02850.1x0
5	High-pressure degasser (H-DEG) 6.02850.000	6	Type label (see chapter 1.2, page 1)

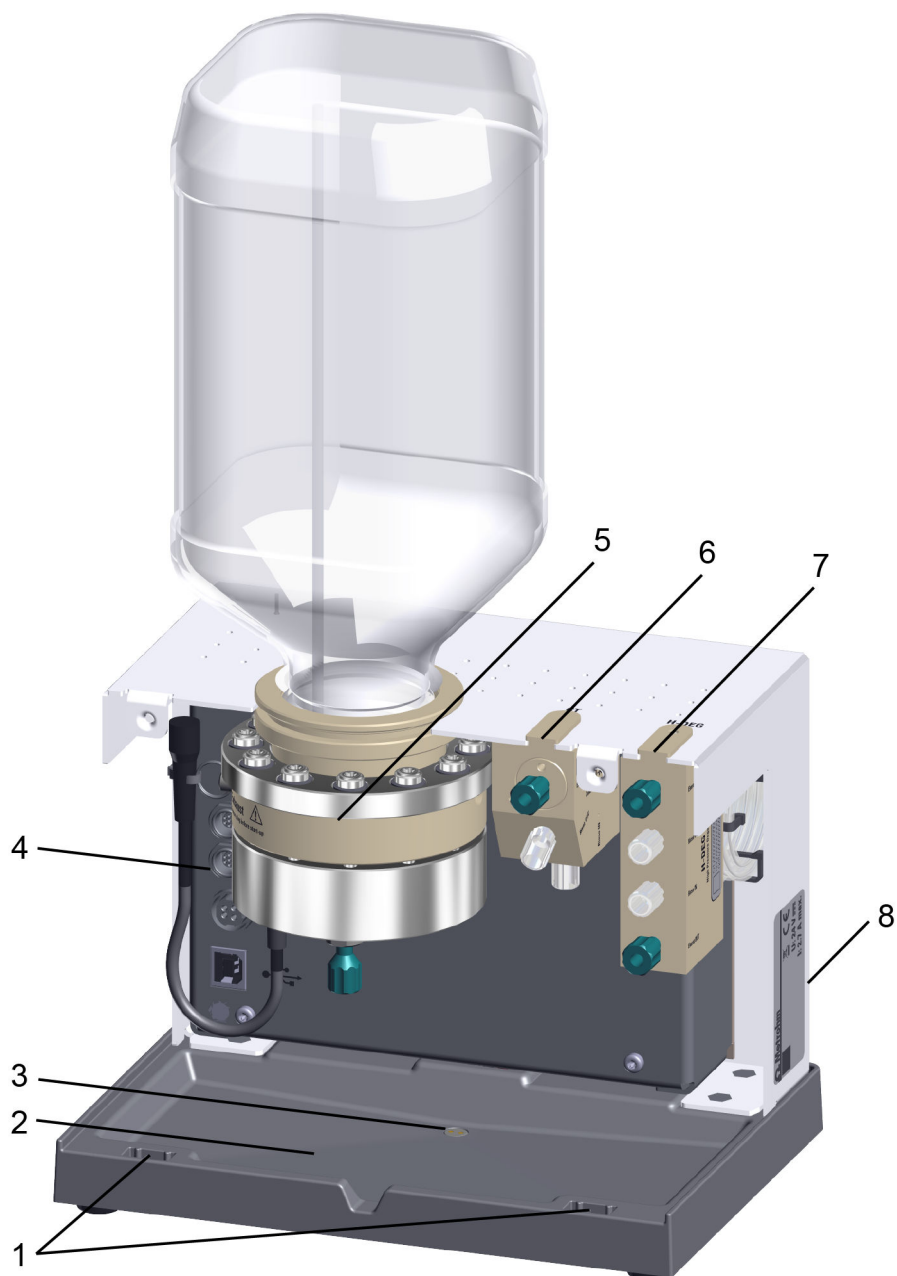


Figure 5 948 Continuous IC Module with accessories – Rear open

1	Slots for guide clips	2	Base tray
3	Leak sensor	4	Sockets for cable connections <i>(see figure 6, page 15)</i>
5	Eluent Producer cartridge (EPC) 6.02850.2x0	6	Continuous Trap (CT) 6.02850.1x0
7	High-pressure degasser (H-DEG) 6.02850.000	8	Type label <i>(see chapter 1.2, page 1)</i>

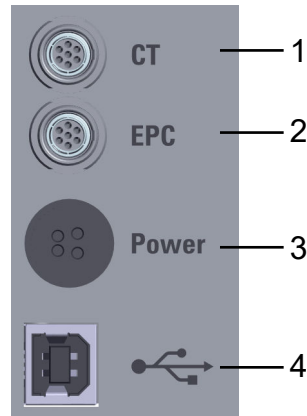







Figure 6 Sockets for cable connections

1 Socket CT	2 Socket EPC
3 Power socket 24 V DC For the 6.2164.010 portable power supply unit 100 - 240 V/24 V DC	4 USB connector USB type B for the 6.2151.020 USB connecting cable USB A - USB B / 1.8 m

3.1.3 Signal status display

The status display uses colors and/or flashing patterns to display the operating status of the 948 Continuous IC Module. The meaning of the colors and flashing patterns is explained in the following table.

Visual signal		Meaning
	LED lights up orange.	Firmware is being loaded
	LED flashes orange (slowly).	No connection to MagIC Net
	LED lights up green.	Ready for operation
	LED flashes green (slowly).	In operation
	LED flashes red (fast).	Error or leak

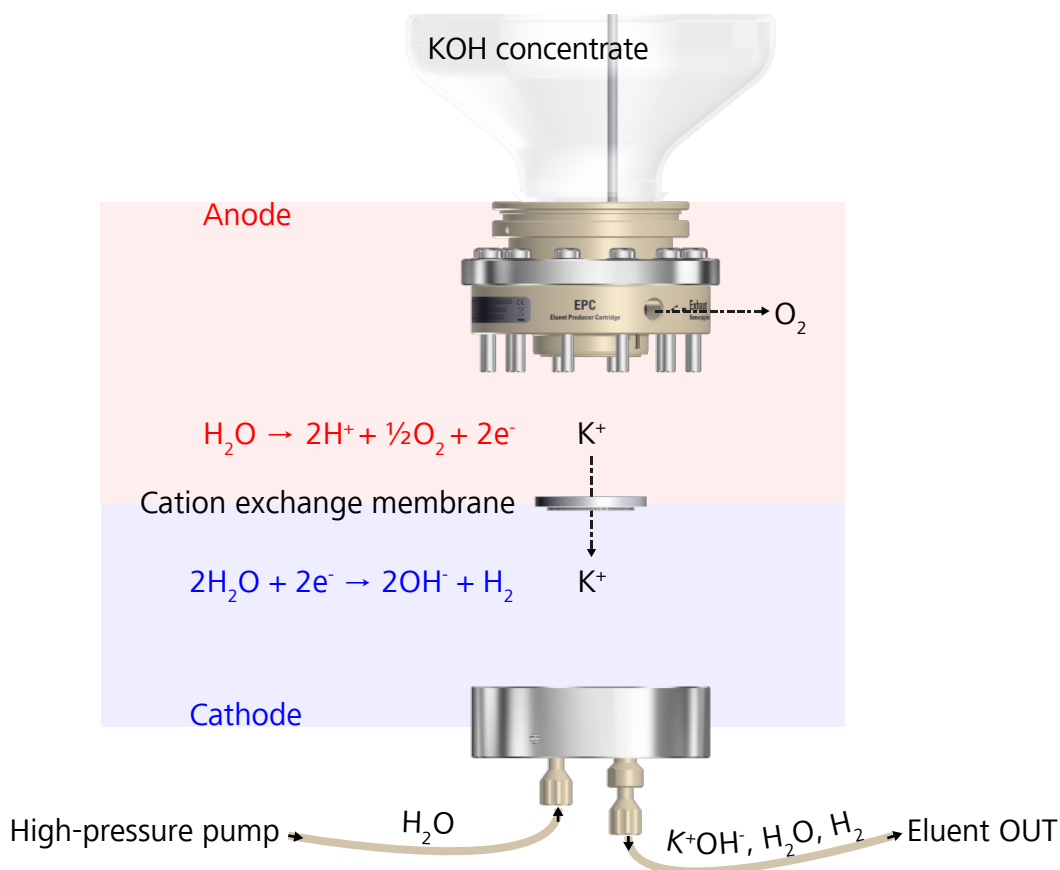


Figure 7 Eluent Producer cartridge – Function

Possible concentration range

The concentration of potassium hydroxide in the eluent is varied by the source current and flow of the high-pressure pump. The higher the source current, the more potassium diffuses through the membrane and the higher the concentration of potassium hydroxide in the eluent. The higher the flow, the lower the concentration.

Determine the possible concentration depending on the selected flow via potassium hydroxide equivalents:

0.5 to 100 equivalents of potassium hydroxide can be produced up to a maximum concentration of 100 mmol/L.



NOTE

Concentration = equivalents/flow rate

Example: Flow = 1.0 mL/min, concentration 0.5 ... 100 mmol/L



Source current

In a functioning system, the KOH concentration in the eluent, the flow of the high-pressure pump and the source current intensity of the Eluent Producer cartridge are in the following relationship with one another:

With a flow of 1 mL/min and a target concentration of 100 mmol/L, the source current is 161 mA.

The target source current for each combination of flow and concentration can be calculated from this.

Table 2 Examples for the calculation of the target source current

Flow	Concentration	Source current
1 mL/min	100 mmol/L	161 mA
1 mL/min	20 mmol/L	32.2 mA
0.5 mL/min	20 mmol/L	16.1 mA

Example: Metrosep A Supp 18:

- Standard flow: 0.5 mL/min
- Standard concentration: 23 mmol/L
- Source current: 18.5 mA

3.2.2 Overview

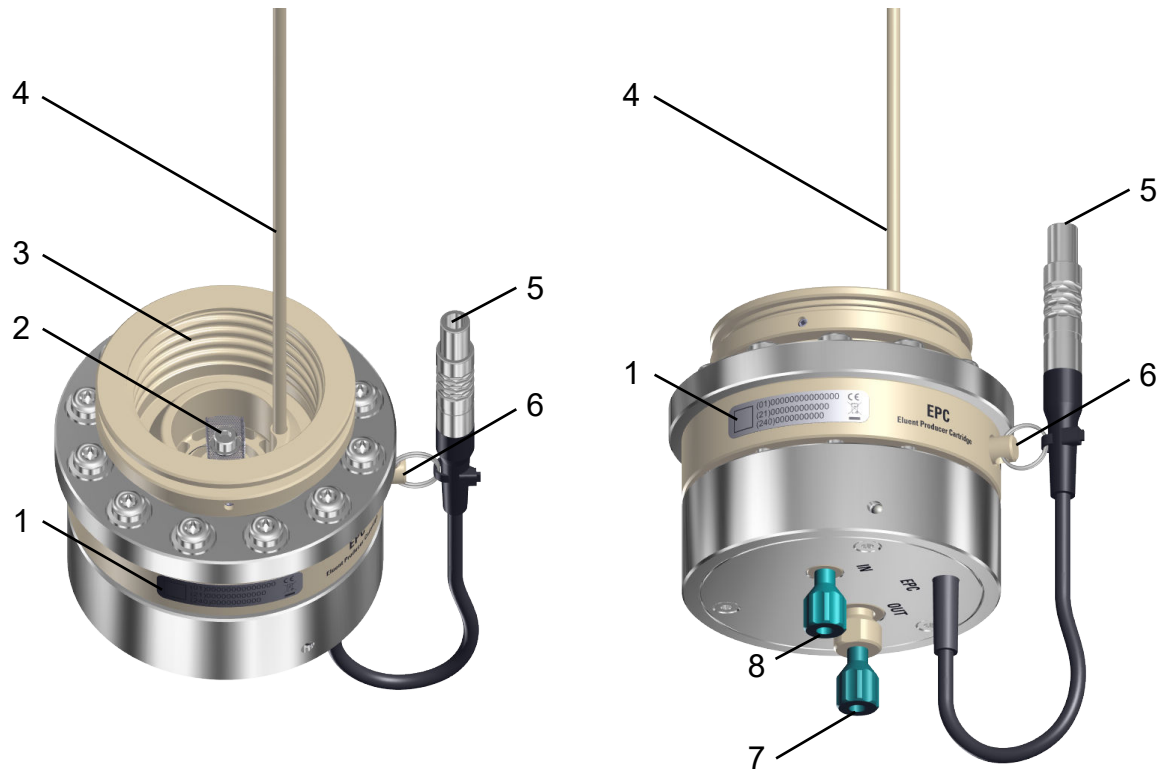


Figure 8 Eluent Producer cartridge – Overview

<p>1 Type label (see chapter 1.2, page 1)</p>	<p>2 Electrode with titanium screw The screw is made of titanium. The system is metal-free.</p>
<p>3 Thread GL 45 For screwing the bottle tight</p>	<p>4 Riser Oxygen escapes from the bottle through the riser and the Exhaust (8-6) opening.</p>
<p>5 EPC plug</p>	<p>6 Exhaust opening with stopper Oxygen escapes from the bottle through the riser (8-4) and the Exhaust opening (see <i>Handling stopper at the exhaust opening</i>).</p>
<p>7 EPC OUT outlet</p>	<p>8 EPC IN inlet</p>

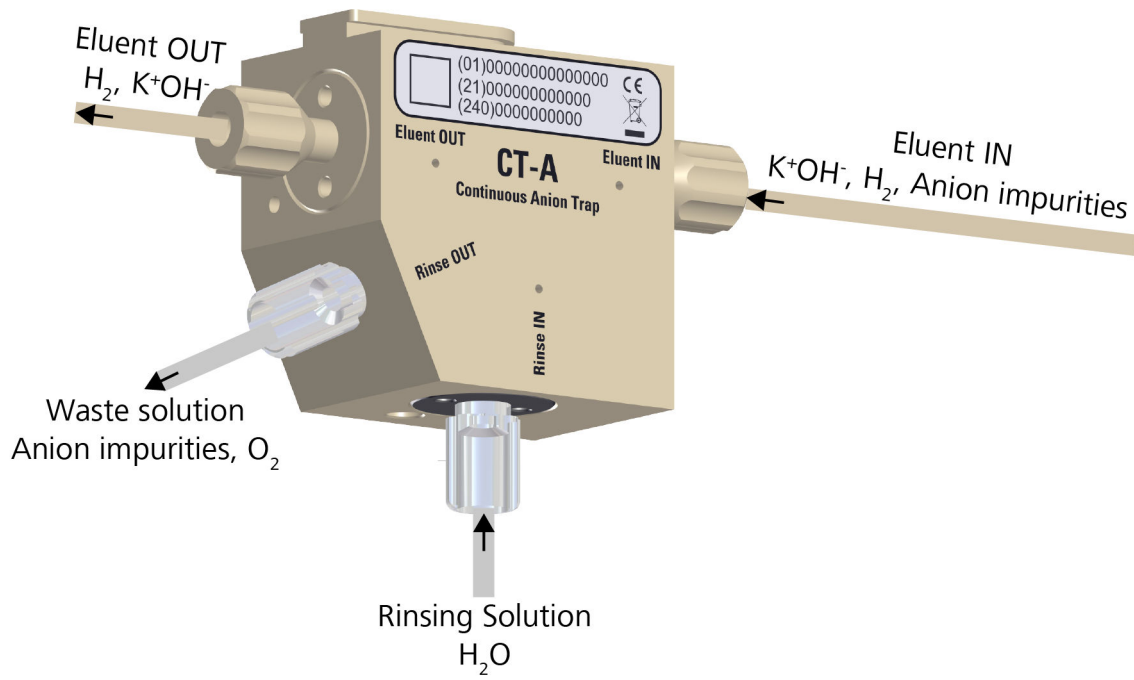


Figure 9 Continuous trap – Function

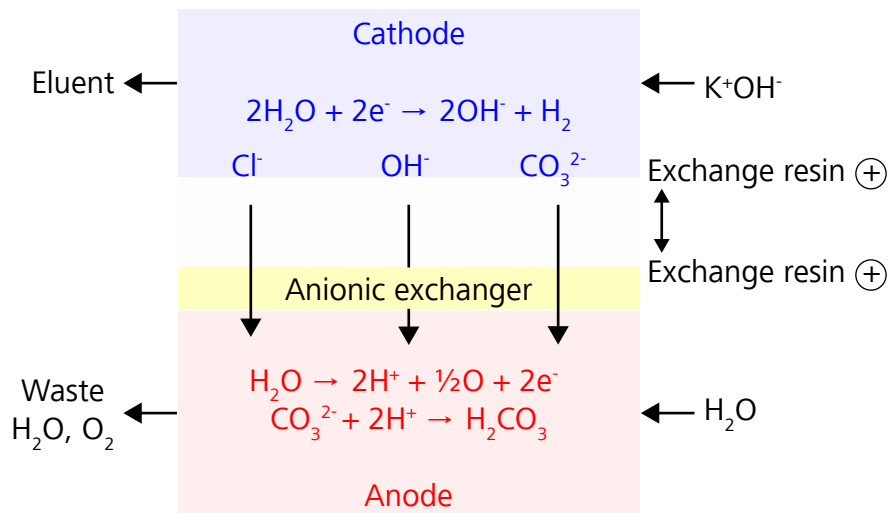


Figure 10 Continuous trap – Functional diagram



3.3.2 Overview

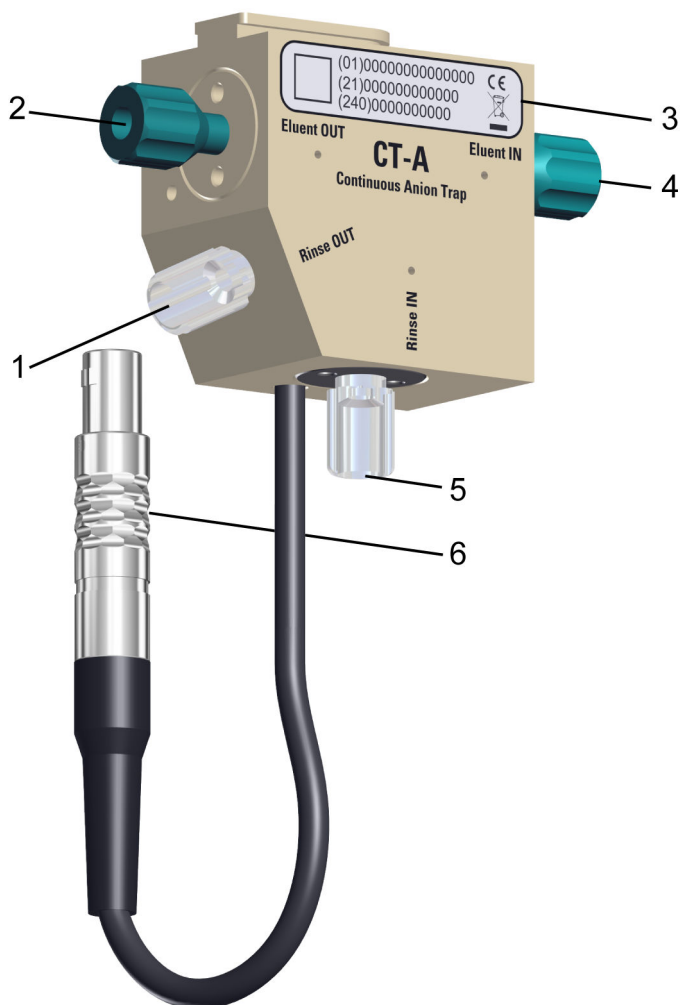


Figure 11 Continuous trap – Overview

1	Rinse OUT outlet	2	Eluent OUT outlet
3	Type label <i>(see chapter 1.2, page 1)</i>	4	Eluent IN inlet
5	Rinse IN inlet	6	CT plug

3.4 High-pressure degasser (H-DEG)

3.4.1 Functional description

Hydrogen is generated during eluent production. The high-pressure degasser removes hydrogen from the eluent, thus providing a stable baseline.

The high-pressure degasser consists of 2 tubings. One tubing runs inside the other tubing. The inner tubing is made of gas-permeable PTFE AF. The eluent is conveyed through the inner tubing. Gases (hydrogen, H_2) diffuse through the inner tubing into the outer tubing. The eluent is thus free of gases. The gases are removed from the high-pressure degasser via a return capillary.

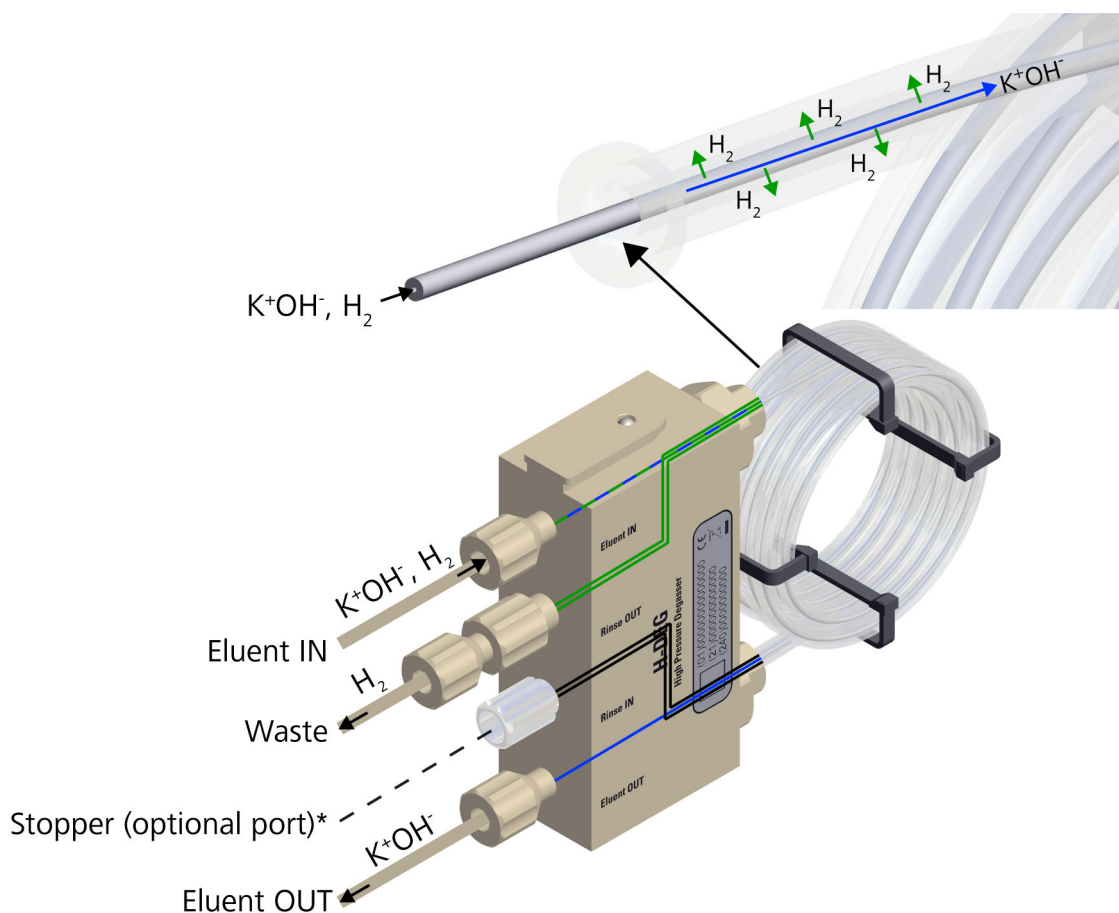


Figure 12 High-pressure degasser – Function

*) The optional port can be used, for example, for active external rinsing or to remove condensate from the outer tubing. The H_2 gas is removed passively in the standard design.

**NOTE****Degasser tubing handling**

Do not remove or loosen the degasser tubing at the rear of the high-pressure degasser. Doing so would mean that the perfect functioning of the high-pressure degasser is no longer ensured.

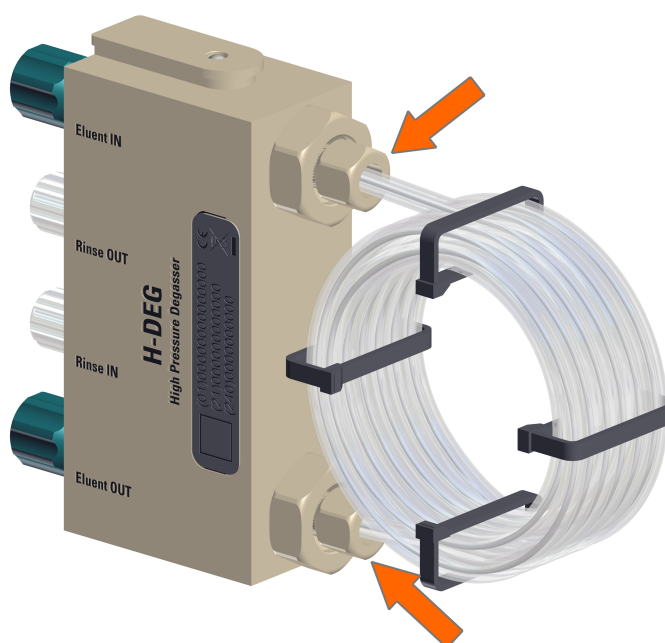


Figure 13 Degasser tubing at the rear of the high-pressure degasser

3.4.2 Overview

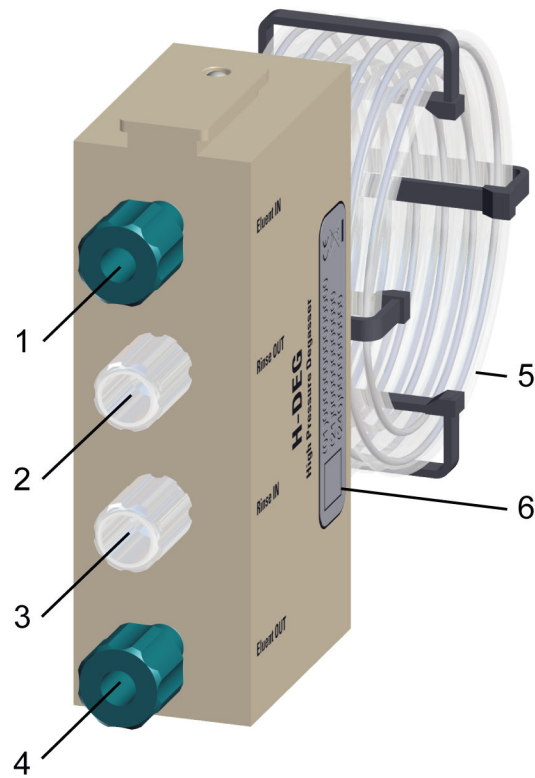


Figure 14 High-pressure degasser – Overview

1	Eluent IN inlet	2	Rinse OUT outlet
3	Rinse IN inlet	4	Eluent OUT outlet
5	Degasser tubings Rinsing tubing and gas-permeable eluent tubing	6	Type label (see chapter 1.2, page 1)

4.2 Setup configurations



CAUTION

Changing setup configurations or locations

Injuries to the feet caused by a device or parts of a device falling down.

- Disconnect all connections before you move or lift the device.

The 948 Continuous IC Module can be used with ion chromatographs from the following product lines:

- Professional IC
- Compact IC
- Eco IC



NOTE

The 948 Continuous IC Module **can not** be used with versions for low-pressure gradients (2.940.1x50). The 948 Continuous IC Module **can** be used with versions for high-pressure gradients, if the high-pressure pumps in the device are not part of a high-pressure gradient.

The 948 Continuous IC Module is placed on the bottle holder of the ion chromatograph. In addition, two 1-liter bottles (6.1608.020) or one 2-liter bottle (6.1608.070) can be placed in front of the 948 Continuous IC Module on the bottle holder.



Figure 15 Bottle holder with 948 Continuous IC Module and bottles

The following columns can be used for applications with the 948 Continuous IC Module:

- Metrosep A Supp 10
- Metrosep A Supp 17
- Metrosep A Supp 18
- Metrosep A Supp 19
- Metrosep A Supp 21

4.3 Preparing the Eluent Producer cartridge



CAUTION

Material damage caused by contamination

The Eluent Producer cartridge may become contaminated if the inside of the Eluent Producer cartridge is touched without wearing gloves.

- Always wear **gloves** when handling the Eluent Producer cartridge.

Preparing the Eluent Producer cartridge

Prerequisite:

- The **Exhaust** opening on the Eluent Producer cartridge is closed.



WARNING

Risk of injury due to hazardous materials

A stopper closes the **Exhaust** opening of the Eluent Producer cartridge. Concentrate may leak out if the **exhaust** opening is open while the bottle is being handled.

- Make sure that the 948 Continuous IC Module is switched off to change the concentrate bottle.
- Make sure that the stopper closes the **Exhaust** opening while handling the bottle.
- Wear personal protective equipment (e.g. protective glasses, gloves).

Required accessories:

- Bottle with high-purity 4 mol/L potassium hydroxide (not available from Metrohm AG)

**NOTE**

Metrohm recommends using the KOH bottle from Merck (67109-1L, potassium hydroxide solution, 4 M).

At the time of delivery, the Eluent Producer cartridge is equipped with the PE bottle, 1,000 mL, GL 45 (6.1608.040). If the KOH bottle from Merck is not used, pour the concentrate into the PE bottle, 1,000 mL, GL 45 (6.1608.040). Metrohm cannot guarantee leak-tightness with other bottles.

1 Rinsing the Eluent Producer cartridge**NOTE**

The 948 Continuous IC Module is free of metal. The screw visible inside the Eluent Producer cartridge is made of titanium.

- Unscrew the Eluent Producer cartridge from the bottle.
- The bottle is filled with ultrapure water at time of delivery. Empty the water.
- Add 100 mL of ultrapure water to the bottle.
- Screw the Eluent Producer cartridge onto the bottle.
- Shake the Eluent Producer cartridge with the bottle well to clean the Eluent Producer cartridge and the riser.
- Unscrew the Eluent Producer cartridge from the bottle and empty the water. The bottle is no longer needed afterwards.

The Eluent Producer cartridge is rinsed. The bottle can now be replaced.

2 Putting on the concentrate bottle**WARNING****Risk of injury due to dangerous gases**

If concentrates containing halogens are used, corrosive gases may be produced.

- Use only **high purity 4 mol/L potassium hydroxide** as concentrate.

**CAUTION****Damage to the Eluent Producer cartridge due to corrosive gases**

If concentrates containing halogens are used, corrosive gases may be produced.

Corrosive gases can cause damage to the membrane and thus shorten the service life of the Eluent Producer cartridge.

- Use only **high purity 4 mol/L potassium hydroxide** as concentrate.
- Open the concentrate bottle.
- Screw the Eluent Producer cartridge onto the concentrate bottle.

**NOTE**

Screw the bottle tightly shut by hand.

3 Removing the back panel of the 948 Continuous IC Module

- Loosen the two knurled screws on the back panel of the housing.
- Remove the back panel of the housing and set it aside.

4 Inserting the Eluent Producer cartridge

- Rotate the Eluent Producer cartridge upside down along with the concentrate bottle.
- Press the Eluent Producer cartridge into the EPC rail of the housing.

4.4 Preparing FEP tubing

Preparing tubings**Required accessories:**

- Parts from the accessory kit: CEP (6.05000.300)
 - FEP tubing M6, 1/8" x 1.59 mm, CT OUT (6.01805.470)
 - 2 flangeless fittings (6.02744.010)

Each of the flangeless fittings consists of a flangeless screw M6, PEEK and a flangeless ferrule for 1/8", PVDF.
 - Adapter UNF 10/32 outer / M6 inner (6.2744.200)

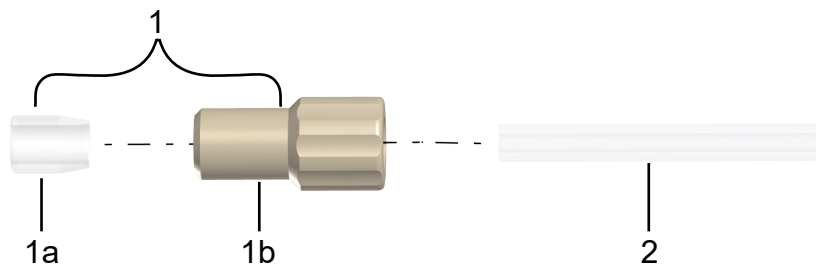


Figure 16 Tubing connection with flangeless fitting

1 Flangeless fitting (6.02744.010)	1a Flangeless ferrule for 1/8", PVDF
1b Flangeless screw M6, PEEK	2 FEP tubing M6, 1/8" x 1.59 mm, CT OUT (6.01805.470)

- 1** Slide a flangeless screw over each tubing end.
The flangeless screw has one end with a thread and one end with an opening for the FEP tubing. Slide a flangeless screw over each tubing end with the opening for the FEP tubing ahead.
- 2** The flangeless ferrule is conical. Slide one ferrule, narrow end first, over each tubing end.
The tubing is prepared. The tubing connection can be established.
- 3** Screw the end of the tubing labeled **948 WASTE** to the UNF 10/32 external / M6 internal (6.2744.200) adapter.

4.5 Establishing capillary connections and tubing connections

The connections for equilibrating the continuous trap are different from the connections for executing determinations.

When installing a new system, proceed as follows:

1. Establish the connections to execute determinations (*see chapter 4.5.1, page 33*).
2. Establish the connections for equilibrating the continuous trap (*see chapter 4.5.2, page 39*).
3. Equilibrate the 948 Continuous IC Module (*see chapter 5.2, page 46*).

4.5.1 Structure with conductivity detection and sequential suppression (SeS)

The 948 Continuous IC Module can be rinsed either with STREAM (Suppressor Treatment with Reused Eluent After Measuring) or with external rinsing.

- STREAM (*see figure 17, page 34*):
Metrohm recommends using STREAM if possible.
The eluent from the conductivity detector is used as a rinsing solution for the MSM and the 948 Continuous IC Module.
- External rinsing (*see figure 18, page 35*):
Metrohm recommends the use of external rinsing with ultrapure water in the following cases:
 - from concentrations of > 80 mmol/L KOH
or
 - if STREAM is not possible, e.g., with coupled techniques (IC-MS)

The rinsing solution is prepared in a separate bottle and conveyed with the peristaltic pump.



NOTE

For external rinsing, a bottle with rinsing solution, a peristaltic pump channel and a pump tubing connection with fuse and filter are required.

The accessories for external rinsing are not included in the scope of delivery!

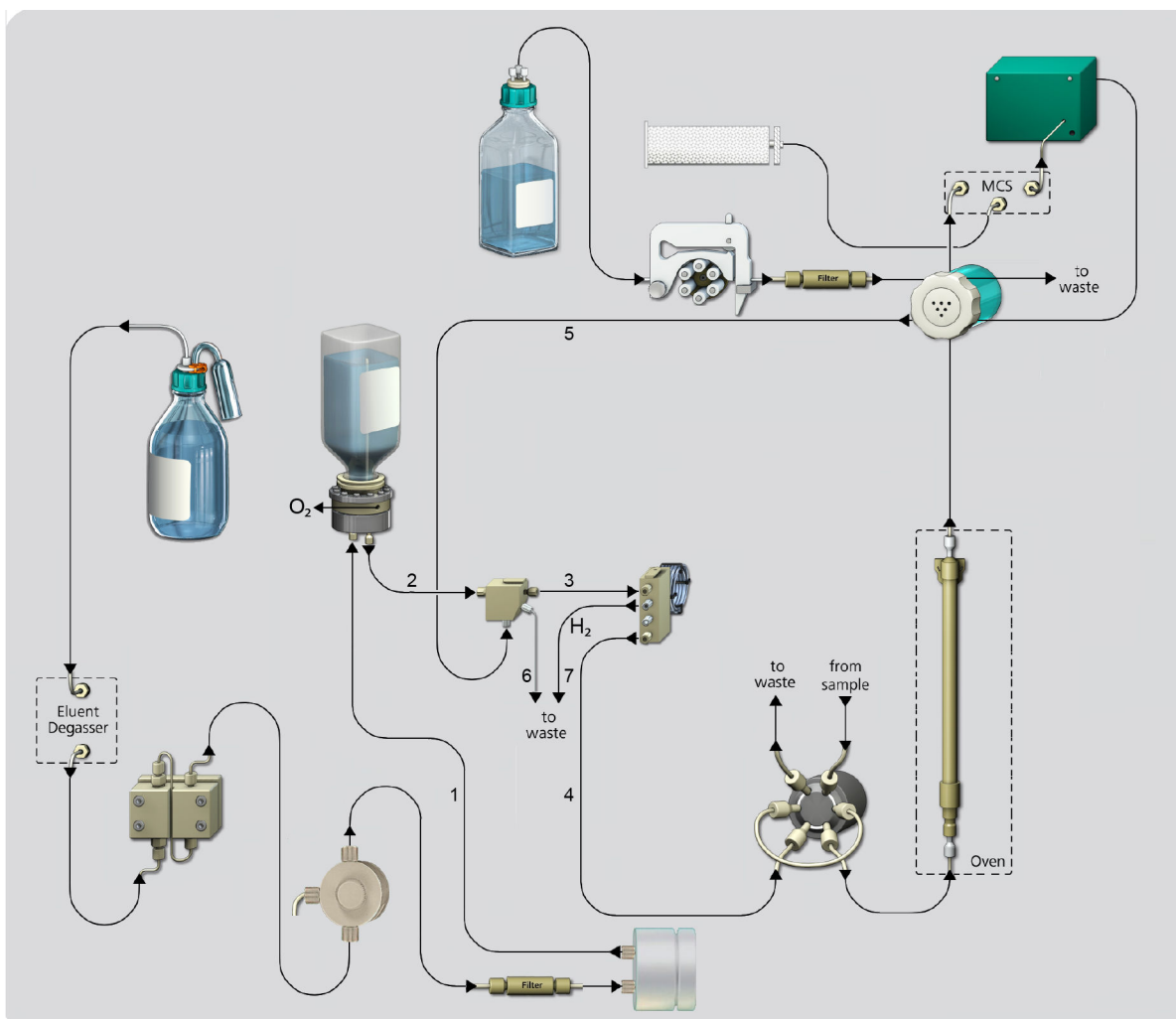


Figure 17 948 Continuous IC Module with conductivity detection and SeS – Flow path with STREAM

1	PEEK capillary, 0.25 mm, HPP OUT (6.01831.010)	2	PEEK capillary, 0.25 mm, EPC OUT (6.01831.020)
3	PEEK capillary, 0.25 mm, CT OUT (6.01831.030)	4	PEEK capillary, 0.25 mm, H-DEG Eluent (6.01831.040)
5	MSM connection capillary waste rinse	6	FEP tubing M6, 1/8" x 1.59 mm, CT OUT (6.01805.470)
7	PEEK capillary, 0.25 mm, H-DEG Rinse (6.01831.050)		

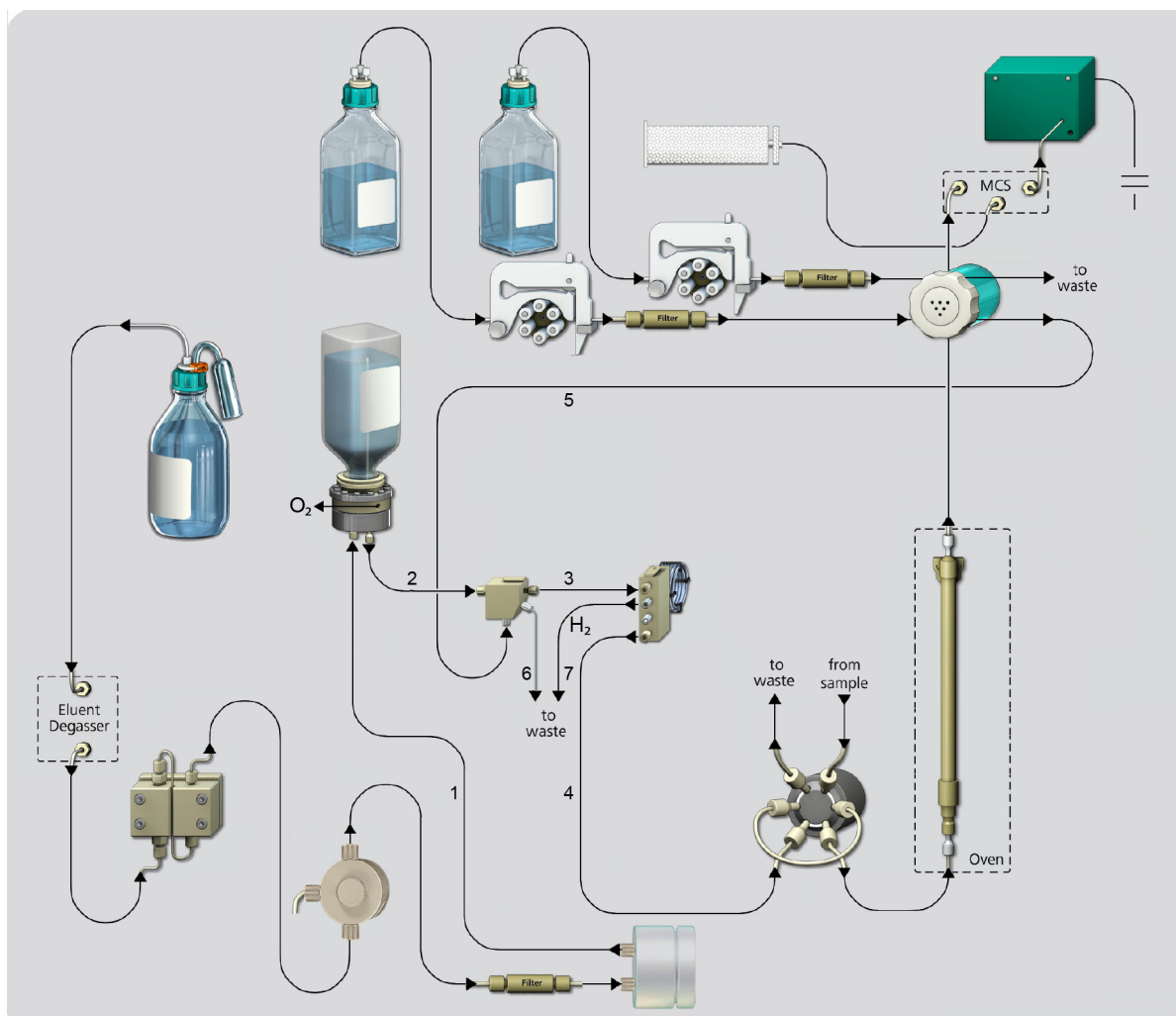


Figure 18 948 Continuous IC Module with conductivity detection and SeS – Flow path with external rinsing

1 PEEK capillary, 0.25 mm, HPP OUT (6.01831.010)

3 PEEK capillary, 0.25 mm, CT OUT (6.01831.030)

5 MSM connection capillary waste rinse

7 PEEK capillary, 0.25 mm, H-DEG Rinse (6.01831.050)

2 PEEK capillary, 0.25 mm, EPC OUT (6.01831.020)

4 PEEK capillary, 0.25 mm, H-DEG Eluent (6.01831.040)

6 FEP tubing M6, 1/8" x 1.59 mm, CT OUT (6.01805.470)

**NOTE**

Tighten the connections in the high-pressure section with the wrench for pressure screws.

1 Connecting the pulsation absorber and the Eluent Producer cartridge

Use the PEEK capillary, 0.25 mm, HPP OUT (17-1) and 2 pressure screws to connect the pulsation absorber of the ion chromatograph and the Eluent Producer cartridge.

- On the ion chromatograph, loosen the connection between the pulsation absorber and the injector. The capillary is no longer used. The pressure screws are used for the new connections.
- Screw the end of the PEEK capillary, 0.25 mm, HPP OUT labeled **HPP OUT** onto the outlet of the pulsation damper. To accomplish this, use the pressure screw already located at the outlet of the pulsation damper.
- Guide the capillary through the channels for capillaries between the device and the base tray to the rear of the ion chromatograph.
- Screw the end of the capillary labeled **EPC IN** onto the **Eluent IN** inlet of the Eluent Producer cartridge.

2 Connecting the Eluent Producer cartridge and the continuous trap

Use the PEEK capillary, 0.25 mm, EPC OUT (17-2) and 2 pressure screws to connect the Eluent Producer cartridge and the continuous trap.

- Screw the end of the capillary labeled **EPC OUT** onto the **Eluent OUT** outlet of the Eluent Producer cartridge.
- Screw the end of the capillary labeled **CT IN** onto the **Eluent IN** inlet of the continuous trap.

To accomplish this, do not yet insert the continuous trap into the rail of the housing. Otherwise, the connections are no longer accessible.

3 Connecting the continuous trap and the high-pressure degasser

Use the PEEK capillary, 0.25 mm, CT OUT (17-3) and 2 pressure screws to connect the continuous trap and the high-pressure degasser.



- Screw the end of the capillary labeled **CT OUT** onto the **Eluent OUT** outlet of the continuous trap.
- Press the high-pressure degasser into the H-DEG rail of the housing.
- Screw the end of the capillary labeled **H-DEG IN** onto the **Eluent IN** inlet of the high-pressure degasser.

4 Connecting the high-pressure degasser and the injector

Use the PEEK capillary, 0.25 mm, H-DEG Eluent (17-4) and 2 pressure screws to connect the high-pressure degasser and the injector of the ion chromatograph.

- Screw the end of the capillary labeled **H-DEG Eluent OUT** onto the **Eluent OUT** outlet of the high-pressure degasser.
- Guide the capillary through the channels for capillaries between the device and the base tray to the front of the ion chromatograph.
- Screw the end of the capillary labeled **INJECTOR IN** onto injector port 4. To accomplish this, use the pressure screw already located at the injector port.

5 Connecting the continuous trap and MSM

Connect the continuous trap with the MSM connection capillary **waste rinse** (17-5).

- Loosen the **waste rinse** MSM connection capillary from the waste collector.
- Guide the capillary through the channels for capillaries to the rear of the ion chromatograph.
- Screw the **waste rinse** MSM connection capillary onto the **Rinse IN** inlet of the continuous trap using a pressure screw and an M6 / UNF 10/32 thread adapter (6.2744.080).
- Press the continuous trap into the CT rail of the housing.

6 Connecting the continuous trap and waste collector

Use the FEP tubing M6, 1/8" x 1.59 mm, CT OUT (17-6) to connect the continuous trap and the waste collector.

- Screw the end of the tubing labeled **CT OUT** onto the **Rinse OUT** outlet of the continuous trap with a pressure screw.
- Screw the end of the tubing labeled **948 WASTE** onto the waste collector.

7 Connecting the high-pressure degasser and the waste collector

Use the PEEK capillary, 0.25 mm, H-DEG Rinse (17-7) to connect the high-pressure degasser and the waste collector.

- Screw the end of the capillary labeled **H-DEG Rinse OUT** onto the **Rinse OUT** outlet of the high-pressure degasser using a pressure screw and an M6 / UNF 10/32 thread adapter (6.2744.080).
- Screw the end of the capillary labeled **948 WASTE** onto the waste collector. Use one of the PVDF pressure screws already on the waste collector.

The **Rinse IN** inlet of the high-pressure degasser is not used.

4.5.2 Structure for equilibrating

The flow diagram shows the structure for equilibrating the continuous trap.

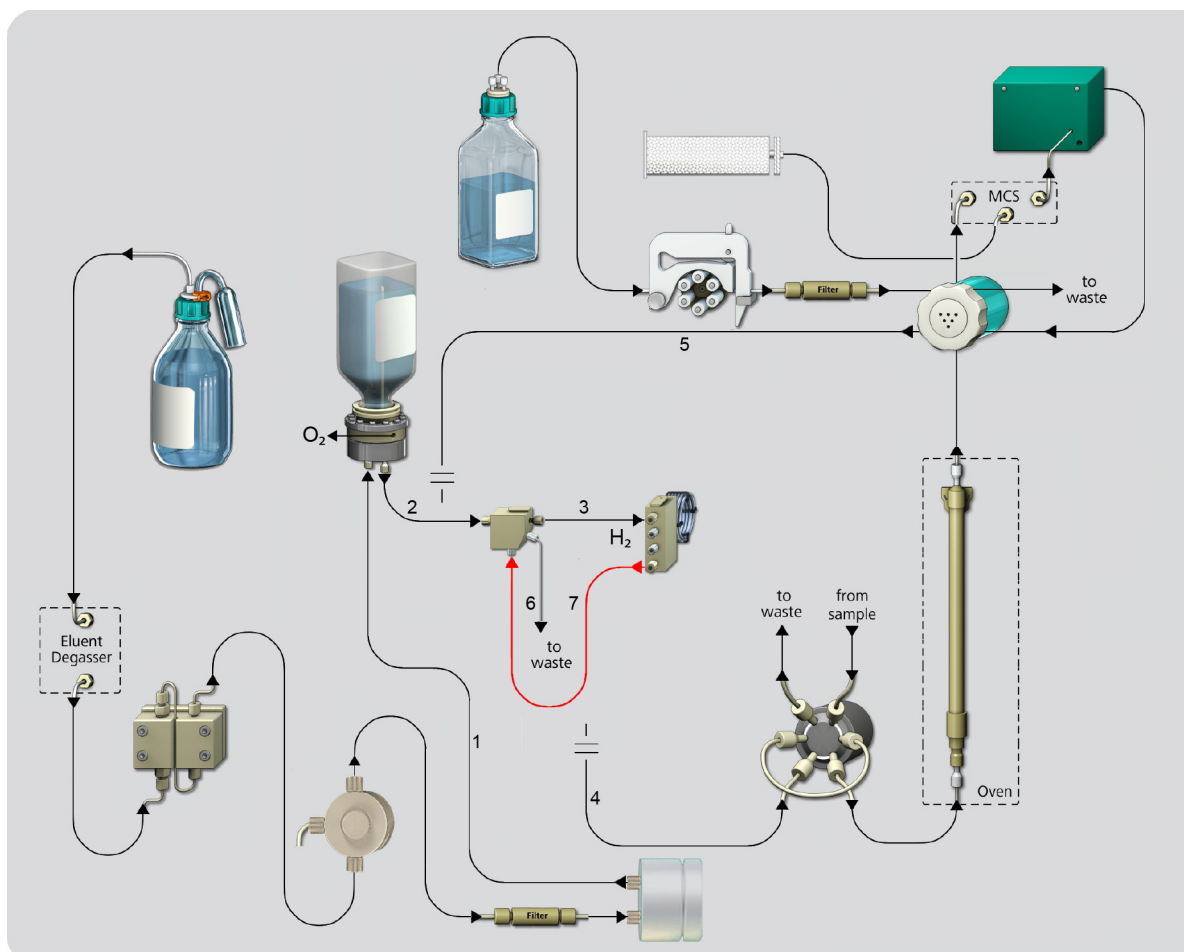


Figure 19 Equilibrating the continuous trap – Flow path

1 PEEK capillary, 0.25 mm, HPP OUT (6.01831.010)

3 PEEK capillary, 0.25 mm, CT OUT (6.01831.030)

5 MSM connection capillary waste rinse

7 PEEK capillary, 0.25 mm, H-DEG Rinse (6.01831.050)

2 PEEK capillary, 0.25 mm, EPC OUT (6.01831.020)

4 PEEK capillary, 0.25 mm, H-DEG Eluent (6.01831.040)

6 FEP tubing M6, 1/8" x 1.59 mm, CT OUT (6.01805.470)

**NOTE**

Oxygen and hydrogen are produced in the system.

Oxygen escapes via the **Exhaust** opening of the Eluent Producer cartridge.

Hydrogen escapes via the vent hole on the waste collector. To ensure that the hydrogen escapes, observe the following points:

- Use the waste collector.
- Do not close the vent hole on the waste collector.
- Make the capillary connections and tubing connections to the waste collector according to the procedure *Establishing the flow path for equilibrating*, page 41.

Establishing the flow path for equilibrating

Prerequisite:

- The capillary connections for the structure with conductivity detection and sequential suppression are established (see chapter 4.5.1, page 33).

Required accessories:

- Wrench for pressure screws (6.2739.000)

**NOTE**

Tighten the connections in the high-pressure section with the wrench for pressure screws.

1 Loosening connections

- Pull the continuous trap straight back out of the CT rail of the housing.
- Loosen the MSM connection capillary **waste rinse** (19-5) from the **Rinse IN** inlet of the continuous trap.
- Loosen the PEEK capillary, 0.25 mm, H-DEG Eluent (19-4) from the **Eluent OUT** outlet of the high-pressure degasser.
- Loosen the PEEK capillary, 0.25 mm, H-DEG Rinse (19-7) from the **RINSE OUT** outlet of the high-pressure degasser.
- Loosen the PEEK capillary, 0.25 mm, H-DEG Rinse (19-7) from the waste collector.



2 Establishing the connection for equilibrating

Use the PEEK capillary, 0.25 mm, H-DEG Rinse (19-7) to connect the high-pressure degasser with the continuous trap.

- Screw the end of the capillary labeled **H-DEG Rinse OUT** onto the **Rinse IN** inlet of the continuous trap using a pressure screw. To do this, use the M6 / UNF 10/32 thread adapter (6.2744.080) that is already located on the **Rinse IN** inlet.
- Screw the end of the capillary labeled **948 WASTE** onto the **Eluent OUT** outlet of the high-pressure degasser using a pressure screw.
- Close the **Rinse OUT** outlet of the high-pressure degasser with a stopper.
- Press the continuous trap into the CT rail of the housing.


4.6 Establishing the cable connections

Establishing the cable connections

Required accessories:

- Power supply unit 100 - 240 V/24 V DC (6.2164.010)
- Cable USB A - USB B / 1.8 m (6.2151.020)
- Parts from the accessory kit: CEP (6.05000.300)
 - Mounting ribbon (6.2053.030)

1 Connecting the USB connection

- Plug the USB-B connector of the USB cable into the socket .
- Plug the USB A connector of the USB cable into a USB connection socket of the ion chromatograph or the computer.

2 Preparing the energy supply

- Fasten the power supply unit to the rear of the ion chromatograph using the mounting ribbon. This prevents the power supply unit from getting wet if liquids spill over.
- Plug the power cord into the power socket **Power 24V**. Do **not** yet connect the power cord to the power grid!

3 Connecting the continuous trap

- Plug the plug of the continuous trap into the **CT** socket.

4 Connecting the Eluent Producer cartridge



WARNING

Risk of injury due to hazardous materials

When installing the Eluent Producer cartridge on the concentrate bottle, concentrate may enter the riser. When removing the stopper, the concentrate may leak from the **Exhaust** opening.

- Wear personal protective equipment (e.g. protective glasses, gloves).

A stopper closes the **Exhaust** opening of the Eluent Producer cartridge. The **Exhaust** opening must be open during operation. As a result, the plug of the Eluent Producer cartridge and the stopper are connected to one another. The plug can be inserted only if the stopper is open.



NOTE

Handling the stopper at the Exhaust opening

During operation, the **Exhaust** opening must always be open so that oxygen can escape from the bottle.

Outside of operation, the **Exhaust** opening must always be closed with the stopper so that no concentrate leaks out when the 948 Continuous IC Module is moved.

- Remove the stopper from the **Exhaust** opening.
If liquid leaks out of the **Exhaust** opening, wipe it up with a cloth.
- Plug the plug of the Eluent Producer cartridge into the **EPC** socket.

4.7 Closing the housing

Closing the housing



NOTE

Operate the device only with the housing closed. Always insert the back panel before operation.

Required accessories:

- Parts from the accessory kit: CEP (6.05000.300)
 - 2 guide clips, CM (6.02705.100)

- 1 Insert guide clips into both slots for guide clips on the housing.

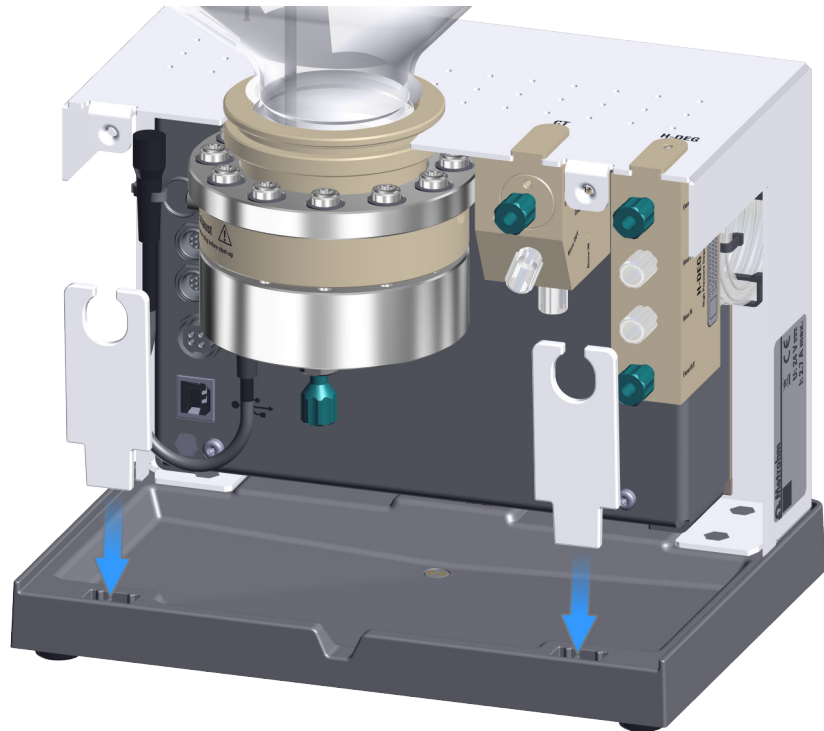


Figure 20 Mounting the guide clips

- 2 Place all cables, capillaries and tubings leading out of the 948 Continuous IC Module in the guide clips.
- 3 Insert the back panel of the housing. Tighten the knurled screws by hand to fasten the back panel in place.

4.8 Connecting the instrument to the power grid



WARNING

Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument while the power cord is still connected.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- Unplug the power plug immediately if you suspect that moisture has gotten inside the instrument.
- Only personnel who have been issued Metrohm qualifications may perform service and repair work on electrical and electronic parts.

Connecting the power cord

Accessories

Power cord with the following specifications:

- Length: max. 2 m
- Number of cores: 3, with protective conductor
- Instrument plug: IEC 60320 type C13
- Conductor cross-section 3x min. 1.0 mm² / 18 AWG
- Power plug:
 - according to customer requirement (6.2122.XX0)
 - min. 10 A



NOTE

Do not use a not permitted power cord!

1 Plugging in the power cord

- Plug the power cord into the instrument's power socket.
- Connect the power cord to the power grid.

5 Start-up

5.1 Initial start-up

As a basic rule, the initial start-up of the system is carried out by the regional Metrohm service representative.

5.2 Rinsing the system and equilibrating

The continuous anion trap must be equilibrated at the time of initial start-up of the 948 Continuous IC Module and after the continuous trap has been replaced.



NOTE

During operation, condensate may form in the outer tubing of the high-pressure degasser. The condensate is made up of water. This is harmless, and does not affect the function of the high-pressure degasser.



NOTE

Additional information concerning the use of MagIC Net can be found in the MagIC Net online help or in the MagIC Net manual.

Preparation

The 948 Continuous IC Module is put into operation together with the ion chromatograph.

Prerequisite:

- The structure for equilibrating is installed (*see chapter 4.5.2, page 39*).
- The ion chromatograph is connected to a computer where MagIC Net 4.2 or higher is installed.

1 Starting the software

- Start the MagIC Net software.
- Enter user name and password.

The software starts and shows the **Workplace** program part.

2 Switching on the devices

- Switch on the 948 Continuous IC Module.
- Switch on the ion chromatograph.
MagIC Net detects all of the instruments and asks if they are to be saved to the device table.
- Confirm all of the prompts with **[Yes]**.



NOTE

It may happen that a device is not automatically recognized if it is being newly connected to an existing system.

If a device was not automatically detected, run "basic initialization" in MagIC Net. Additional information concerning the basic initialization can be found in the MagIC Net online help or in the MagIC Net manual.

3 Downloading example methods

- Visit the [Metrohm website for the 948 Continuous IC Module](#).
- Download and unzip the folder with the example methods.
- Import the methods in MagIC Net.

Rinsing the system

Use the **948_930_Preparation_1** method to rinse the continuous trap and Eluent Producer cartridge.

1 Creating the EPC solution

- In the **Configuration** program part, create a **EPC solution** with the following settings:
 - **Solution ► Solution name:** KOH Eluent Concentrate
 - **Solution ► Concentration:** 4.0 mol/L
 - **Monitoring ► Monitor the concentration:** Active
 - **Monitoring ► Concentration limit:** 0.4 mol/L



NOTE

Metrohm recommends using KOH concentrate from Merck (67109-1L, potassium hydroxide solution, 4 M).

Analysis	
Hardware assignment ▶	
Data source	Pump ▶ System pressure
Pump	Pump of IC used
Professional IC/Compact IC/Eco IC	
Pump ▶	
Flow	1.5 mL/min
Pmin	1.0 MPa
Pmax	21.0 MPa
Start-up time	Active, 1 min
Peristaltic ▶	On
Rate	3
Oven/Thermostat ▶	On
Temperature	30 °C
Monitor temperature stability	Off
948 Continuous IC Module	
Continuous Eluent Producer (CEP) ▶	
Pump	Pump of IC used

Equilibrating the system

The system is equilibrated with the **948_ProfIC Vario_15_930** method and initial measurements are made.

- The structure for conductivity detection and sequential suppression (SeS) is installed (*see chapter 4.5.1, page 33*).



NOTE

Before carrying out the first measurements in the system, equilibrate the MSM for at least 2 h and ensure that the conductance is < 0.5 µS/cm.

The equilibration of the MSM is described in the manual for the ion chromatograph.

1 Adjusting a method

- In the **Method** program part, open the **948_ProfIC Vario_15_930** example method.
- A 930.2560 Compact IC Flex Oven/SeS/PP/Deg is used in the example method.
If another ion chromatograph is used, then adapt the example method to the existing system.
Set the following parameters in the same way as the **948_ProfIC Vario_15_930** example method: (see "Parameter 948_ProfIC Vario_15_930", page 50)
- Save the method.

2 Starting determinations

- Create the following sample table in the Workplace program part: 12 determinations with the **948_ProfIC Vario_15_930** method
- Start the determination with **[Start]**.

The system is equilibrated with the determinations 1 to 6. The results must be discarded.

Initial evaluations can be made with determinations 7 to 12.

Parameter 948_ProfIC Vario_15_930

Analysis	
Hardware assignment ▶	
Data source	Cond detector ▶ Conductivity
Injection valve	Injection valve of the IC used
Pump	Pump of IC used
Column	Columns used (see chapter 4.2, page 27)

Professional IC/Compact IC/Eco IC	
Pump ▶	
Flow	Observe the maximum flow rate of the selected column! 0.8 mL/min
Pmin	1.0 MPa
Pmax	21.0 MPa
Start-up time	Active, 1 min
Peristaltic	Analogous to parameter 948_930_Preparation_1 (see menu "Professional IC/Compact IC/Eco IC", page 49)
Oven/Thermostat	Analogous to parameter 948_930_Preparation_1 (see menu "Professional IC/Compact IC/Eco IC", page 49)
<hr/>	
948 Continuous IC Module	Analogous to parameter 948_930_Preparation_1 (see menu "948 Continuous IC Module", page 49)

6 Operation

The 948 Continuous IC Module is operated using the MagIC Net software. You can find information on operating the software in the tutorial for MagIC Net or in the online help.

7 Operation and maintenance



NOTE

During operation, condensate may form in the outer tubing of the high-pressure degasser. The condensate is made up of water. This is harmless, and does not affect the function of the high-pressure degasser.

7.1 MSM regeneration

To ensure stable suppression, always regenerate the suppressor channels to 100%. To do this, work with the following settings:

- Regeneration solution: 200 mmol/L sulfuric acid
- Speed of the peristaltic pump: 3 or 4
 - Alternative for short measurements: 500 mmol/L sulfuric acid, regeneration duration 10 minutes, speed of peristaltic pump: 3 or 4
- Regeneration duration: 20 min

7.2 Care

The instrument requires appropriate care. Excess contamination of the instrument may result in functional disruptions and a reduction in the service life of the sturdy mechanics and electronics.

Clean the instrument immediately if chemicals or solvents are spilled on it. The plug connections (particularly the power plug) absolutely must be protected against contamination.



CAUTION

Inward seepage of liquid

Instrument damage through inward seepage of liquid!

- The instrument has been designed so that liquid is largely prevented from being able to get inside the instrument. However, unplug the power plug immediately if you suspect that corrosive media have gotten inside the instrument. This is the only way to prevent extreme damage to the instrument electronics. Contact Metrohm Service immediately.

**WARNING**

Only trained personnel may open the instrument's housing.

7.3 Maintenance by Metrohm Service

Maintenance of the instrument is best carried out as part of annual service, which is performed by specialist personnel from Metrohm. A shorter maintenance interval is recommended if you frequently work with caustic and corrosive chemicals. Regional Metrohm service representatives offer every form of technical advice for maintenance and service of all Metrohm devices.

7.4 Cleaning after a leak

Cleaning the base tray and leak sensor

Required accessories:

- 2 cloths
- Ultrapure water
- Ethanol

- 1** ▪ Wipe up spilled liquid with a cloth.
- 2** ▪ Moisten a fresh cloth with ultrapure water. Use it to wipe the base tray and the leak sensor.
 - Moisten the same cloth with ethanol. Use it to wipe the base tray and the leak sensor.

7.5 Replacing the Eluent Producer cartridge or concentrate

In a functioning system, the KOH concentration in the eluent, the flow of the high-pressure pump and the source current intensity of the Eluent Producer cartridge are in the following relationship with one another:

With a flow of 1 mL/min and a target concentration of 100 mmol/L, the source current is 161 mA.

For additional information on the source current, see *Source current*, page 18.

If the target source current is not reached or if the voltage rises sharply, these are signs of a malfunction. The reasons for this are as follows:

- The KOH concentration in the concentrate is too low. Replace the concentrate.
The KOH concentration decreases continuously. The voltage increases continuously as soon as the KOH concentration in the concentrate bottle drops below 400 mmol.
- The Eluent Producer cartridge is defective. Replace the Eluent Producer cartridge.

Replacing the Eluent Producer cartridge and/or the concentrate

Prerequisite:

- The 948 Continuous IC Module is switched off.
- The ion chromatograph does not convey liquids.

Required accessories:

- New Eluent Producer cartridge (6.02850.2x0) and/or bottle with high-purity 4 mol/L potassium hydroxide (not available from Metrohm AG)
- Wrench for pressure screws (6.2739.000)



NOTE

Tighten the connections in the high-pressure section with the wrench for pressure screws.



WARNING

Risk of injury due to dangerous gases

If concentrates containing halogens are used, corrosive gases may be produced.

- Use only **high purity 4 mol/L potassium hydroxide** as concentrate.



CAUTION

Damage to the Eluent Producer cartridge due to corrosive gases

If concentrates containing halogens are used, corrosive gases may be produced.

Corrosive gases can cause damage to the membrane and thus shorten the service life of the Eluent Producer cartridge.

- Use only **high purity 4 mol/L potassium hydroxide** as concentrate.

1 Removing the back panel of the 948 Continuous IC Module

- Loosen the two knurled screws on the back panel of the housing.
- Remove the back panel of the housing and set it aside.
- Remove the guide clips for better accessibility.

2 Loosening the cable connection

- Pull the plug of the Eluent Producer cartridge out of the **EPC** socket.
- Close the **Exhaust** opening of the Eluent Producer cartridge with the stopper.

3 Removing capillary connections

- Loosen the capillary from the **Eluent IN** inlet.
- Loosen the capillary from the **Eluent OUT** outlet.

4 Removing the Eluent Producer cartridge from the housing

- Pull the Eluent Producer cartridge together with the bottle straight back out of the EPC rail of the housing.
- Turn the Eluent Producer cartridge with the bottle upside down so that the Eluent Producer cartridge is **on** the bottle.

5 Rinsing the new Eluent Producer cartridge

This step is necessary only if a new Eluent Producer cartridge is used.



NOTE

The 948 Continuous IC Module is metal-free. The screw visible inside the Eluent Producer cartridge is made of titanium.

- Unscrew the new Eluent Producer cartridge from the bottle.
- The bottle is filled with ultrapure water at time of delivery. Empty the water.
- Add 100 mL of ultrapure water to the bottle.
- Screw the Eluent Producer cartridge onto the bottle.
- Shake the Eluent Producer cartridge with the bottle well to clean the Eluent Producer cartridge and the riser.
- Unscrew the Eluent Producer cartridge from the bottle and empty the water. The bottle is no longer needed afterwards.

The Eluent Producer cartridge is rinsed.

6 Replacing the bottle



WARNING

Risk of injury due to hazardous materials

A stopper closes the **Exhaust** opening of the Eluent Producer cartridge. Concentrate may leak out if the **exhaust** opening is open while the bottle is being handled.

- Make sure that the 948 Continuous IC Module is switched off to change the concentrate bottle.
- Make sure that the stopper closes the **Exhaust** opening while handling the bottle.
- Wear personal protective equipment (e.g. protective glasses, gloves).

9 Establishing the cable connection



WARNING

Risk of injury due to hazardous materials

When installing the Eluent Producer cartridge on the concentrate bottle, concentrate may enter the riser. When removing the stopper, the concentrate may leak from the **Exhaust** opening.

- Wear personal protective equipment (e.g. protective glasses, gloves).

A stopper closes the Exhaust opening of the Eluent Producer cartridge. The Exhaust opening must be open during operation. As a result, the plug of the Eluent Producer cartridge and the stopper are connected to one another. The plug can be inserted only if the stopper is open.



NOTE

Handling the stopper at the Exhaust opening

During operation, the **Exhaust** opening must always be open so that oxygen can escape from the bottle.

Outside of operation, the **Exhaust** opening must always be closed with the stopper so that no concentrate leaks out when the 948 Continuous IC Module is moved.

- Remove the stopper from the **Exhaust** opening. If liquid leaks out of the **Exhaust** opening, wipe it up with a cloth.
- Plug the plug of the Eluent Producer cartridge into the **EPC** socket.

10 Closing the housing



NOTE

Operate the device only with the housing closed. Always insert the back panel before operation.

- Insert guide clips into both slots for guide clips on the housing.
- Place all cables, capillaries and tubings leading out of the 948 Continuous IC Module in the guide clips.

- Insert the back panel of the housing. Tighten the knurled screws by hand to fasten the back panel in place.

The new Eluent Producer cartridge is installed.

11 Rinsing the Eluent Producer cartridge

- Establish the structure for equilibrating (*see chapter 4.5.2, page 39*).
- Adapt the **Startup** example method on the existing system and execute it.

The Eluent Producer cartridge and the continuous trap are rinsed with the following parameters:

- Recording time = 30 min
- KOH concentration = 50 mmol/L
- Flow = 1.5 mL/min
- Establish the structure to execute determinations (*see chapter 4.5.1, page 33*).

7.6 Replacing the continuous trap

The capacity of the membrane decreases over time. In a functioning system, the baseline is at a maximum of 0.6 $\mu\text{S}/\text{cm}$. If the baseline rises above 0.6 $\mu\text{S}/\text{cm}$, replace the continuous trap.

Prerequisite:

- The 948 Continuous IC Module is switched off.
- The ion chromatograph does not convey liquids.

Required accessories:

- New continuous trap (6.02850.1x0)
- Wrench for pressure screws (6.2739.000)



NOTE

Tighten the connections in the high-pressure section with the wrench for pressure screws.

1 Removing the back panel of the 948 Continuous IC Module

- Loosen the two knurled screws on the back panel of the housing.
- Remove the back panel of the housing and set it aside.
- Remove the guide clips for better accessibility.

2 Loosening the cable connection

- Pull the plug of the continuous trap out of the **CT** socket.

3 Loosening the connections of the old continuous trap

- Pull the continuous trap straight back out of the CT rail of the housing.
- Loosen the capillary from the **Eluent IN** inlet.
- Loosen the capillary from the **Eluent OUT** outlet.
- Loosen the tubing from the **Rinse OUT** outlet.

4 Establishing the connections for equilibrating the continuous trap

- The tubing setup for equilibration is different from the tubing setup for performing determinations.
Establish the capillary connections for equilibration (*see chapter 4.5.2, page 39*).
Wait until after equilibration to set up the tubing to perform determinations (*see chapter 4.5.1, page 33*).

5 Establishing the cable connection

- Plug the plug of the continuous trap into the **CT** socket.

6 Closing the housing



NOTE

Operate the device only with the housing closed. Always insert the back panel before operation.

- Insert guide clips into both slots for guide clips on the housing.
- Place all cables, capillaries and tubings leading out of the 948 Continuous IC Module in the guide clips.
- Insert the back panel of the housing. Tighten the knurled screws by hand to fasten the back panel in place.

The new Eluent Producer cartridge is installed.

7 Rinsing the continuous trap

- Establish the structure for equilibrating (*see chapter 4.5.2, page 39*).

- Adapt the **Startup** example method on the existing system and execute it.
The Eluent Producer cartridge and the continuous trap are rinsed with the following parameters:
 - Recording time = 30 min
 - KOH concentration = 50 mmol/L
 - Flow = 1.5 mL/min
- Establish the structure to execute determinations (*see chapter 4.5.1, page 33*).

7.7 Replacing the high-pressure degasser

If no pressure builds up in the system, then the high-pressure degasser is clogged or defective. In this case, replace the high-pressure degasser.

Prerequisite:

- The 948 Continuous IC Module is switched off.
- The ion chromatograph does not convey liquids.

Required accessories:

- New high-pressure degasser (6.02850.000)
- Wrench for pressure screws (6.2739.000)



NOTE

Tighten the connections in the high-pressure section with the wrench for pressure screws.

1 Removing the back panel of the 948 Continuous IC Module

- Loosen the two knurled screws on the back panel of the housing.
- Remove the back panel of the housing and set it aside.
- Remove the guide clips for better accessibility.

2 Loosening connections

- Loosen the capillary from the **Eluent IN** inlet.
- Loosen the capillary from the **Eluent OUT** outlet.
- Loosen the capillary from the **Rinse OUT** outlet.

3 Removing the old high-pressure degasser from the housing

- Pull the high-pressure degasser straight back out of the H-DEG rail of the housing.

4 Inserting the new high-pressure degasser into the housing

- Press the high-pressure degasser into the H-DEG rail of the housing.

5 Establishing connections

- Screw the end of the PEEK capillary, 0.25 mm, CT OUT labeled **H-DEG IN** onto the **Eluent IN** inlet of the high-pressure degasser.
- Screw the end of the PEEK capillary, 0.25 mm, H-DEG Rinse labeled **H-DEG Rinse OUT** onto the **Eluent OUT** outlet of the high-pressure degasser.

6 Closing the housing**NOTE**

Operate the device only with the housing closed. Always insert the back panel before operation.

- Insert guide clips into both slots for guide clips on the housing.
- Place all cables, capillaries and tubings leading out of the 948 Continuous IC Module in the guide clips.
- Insert the back panel of the housing. Tighten the knurled screws by hand to fasten the back panel in place.

The new high-pressure degasser is installed. The 948 Continuous IC Module is ready for operation.

7.8 Shutting down the 948 Continuous IC Module**CAUTION****Damage to the Eluent Producer cartridge**

The membrane in the Eluent Producer cartridge may break if it dries out. In this case, the Eluent Producer cartridge is defective.

- Always keep the concentrate bottle screwed onto the Eluent Producer cartridge. Even if the device is shut down.

If the 948 Continuous IC Module is shut down for 1 week or more, rinse the system. This prevents eluent salts from crystallizing and clogging the high-pressure degasser.

Shutting down the 948 Continuous IC Module

Required accessories:

- Coupling 2 x UNF 10/32 (6.2744.040)

1 Stopping the ion chromatograph

- In the software, stop the ion chromatograph to which the 948 Continuous IC Module is connected.
- Wait until the pressure has been released.

2 Removing the column

- Remove the guard column and the separation column from the eluent path in the ion chromatograph.
- Connect the connection capillaries directly with one another using the coupling 2 x UNF 10/32 (6.2744.040).

3 Rinsing the system

- Set a flow of **1.0 mL/min** in the manual control of the high-pressure pump.
- Start the manual control of the high-pressure pump.
- Rinse the system for 10 minutes.
- After 10 minutes, switch off the high-pressure pump in manual control.



NOTE

Alternatively, a method with the following parameters can be established for rinsing the 948 Continuous IC Module:

- Continuous Eluent Producer (CEP): inactive
- High-pressure pump flow: 1.0 mL/min

4 Disconnecting the 948 Continuous IC Module from the energy supply

- Switch off the 948 Continuous IC Module.
- Disconnect the power cord from the power grid.
- Disconnect the plug of the Eluent Producer cartridge.
- Disconnect the plug of the continuous trap.

5 Inserting the stopper



NOTE

Handling the stopper at the Exhaust opening

During operation, the **Exhaust** opening must always be open so that oxygen can escape from the bottle.

Outside of operation, the **Exhaust** opening must always be closed with the stopper so that no concentrate leaks out when the 948 Continuous IC Module is moved.

- Close the **Exhaust** opening with the stopper.

To put the 948 Continuous IC Module back into operation, proceed in the same way as for installation (*see chapter 4, page 26*).



8 Troubleshooting

8.1 Problems and their solutions

Problem	Cause	Remedy
The baseline increases.	<i>The capacity of the continuous trap membrane is exhausted.</i>	Replace the continuous trap (<i>see chapter 7.6, page 60</i>).
The pressure in the system does not build up.	<i>The high-pressure degasser is clogged or defective.</i>	Replace the high-pressure degasser (<i>see chapter 7.7, page 62</i>).
The voltage of the Eluent Producer cartridge increases continuously.	<i>The KOH concentration in the concentrate is too low.</i>	Replace the concentrate (<i>see chapter 7.5, page 55</i>).
When the source current is low, the voltage is very high.	<i>The KOH concentration in the concentrate is too low.</i>	Replace the concentrate (<i>see chapter 7.5, page 55</i>).
	<i>The Eluent Producer cartridge is defective.</i>	Replace the Eluent Producer cartridge (<i>see chapter 7.5, page 55</i>).

9 Technical specifications

9.1 Ambient conditions

Operation

Nominal function range +5 to +45 °C
at max. 80% relative humidity, non-condensing

Storage +5 to +45 °C
at max. 80% relative humidity, non-condensing

Altitude / Pressure range max. 3,000 m above sea level / min. 700 mbar

Overvoltage category II

Pollution degree 2

9.2 Energy supply

External power supply unit

Inlet

Nominal voltage range 100–240 V AC

Frequency range 50–60 Hz

Current max. 1.5 A

Output

Nominal voltage 24 V DC

Current max. 2.7 A

Power output 65.0 W

Instrument

Inlet

Nominal voltage 24 V DC

Power consumption max. 36.0 W



USB connector

<i>Nominal voltage</i>	5 V DC \pm 5%
<i>Current at computer USB</i>	max. 500 mA

Protection

<i>Internal fuse</i>	1.5 ATH, cannot be replaced by the user
----------------------	---

9.3 Dimensions

Measurements

<i>Width</i>	188 mm
<i>Height</i>	150 mm
<i>with EPC</i>	340 mm
<i>Depth</i>	134 mm

Weight

1.948.0000	approx. 2.2 kg (device without power supply unit and accessories)
2.948.0010	approx. 3.6 kg (device with power supply unit and accessories)

9.4 Housing

Materials

<i>Cover, back panel</i>	1.4301 stainless steel, powder-coated
<i>Base</i>	PP, polypropylene

IP degree of protection	IP 22
--------------------------------	-------

9.5 Connectors specifications

Energy supply

Socket IEC 60320, type C14, 10 A

Power cord

Length max. 2 m

Number of conductors 3, with protective conductor

Conductor cross-section min. 1.0 mm² / 18 AWG

Power In

Socket Round plug 4-pin

USB

Type 2.0

Socket Type B

Cable type shielded

Cable length max. 4.5 m

9.6 Display specifications

Status display LED, green-red

9.7 Eluent production specifications

Flow rate 0.1–3.0 mL/min

Pressure max. 21 MPa

Concentration 0.1 – 100 mmol/L, depending on flow (see "Source current", page 18).

Solvents max. 25% methanol

Eluent Producer cartridge refillable (see "Replacing the Eluent Producer cartridge and/or the concentrate", page 55)

Index

948 Continuous IC Module	
Functional description	10
Overview	10

A

Ambient conditions	67
--------------------------	----

C

Cable connection	42
Capillary connection	32
Care	53
Cleaning	54
Closing the housing	44
Concentrate	
Replace	55
Connect	
Cable	42
Capillaries	32
Connect to power grid	45
Tubings	32
Connectors specifications	69
Continuous trap	
Functional description	20
Overview	22
Replace	60

D

Dimensions	68
Display specifications	69

E

Electrostatic charge	8
Eluent Producer cartridge	
Functional description	16
Overview	19
Prepare	29

Replace	55
Eluent production specifications	
.....	69
Energy supply	67
Equilibration	46

F

FEP tubing	31
Functional description	
948 Continuous IC Module ..	10
Continuous trap	20
Eluent Producer cartridge ...	16
High-pressure degasser	23

H

High-pressure degasser	
Functional description	23
Overview	25
Replace	62
Humidity	67

I

Initial start-up	46
Instrument description	1
Intended use	5
IP degree of protection	68

M

Material	68
----------------	----

O

Operation	67
Overview	
948 Continuous IC Module ..	10
Continuous trap	22
Eluent Producer cartridge ...	19

High-pressure degasser	25
Overvoltage category	67

P

Power connection	45
Prepare	
Eluent Producer cartridge ...	29
Preparing	
FEP tubing	31
Product versions	1

R

Replace	
Concentrate	55
Continuous trap	60
Eluent Producer cartridge ...	55
High-pressure degasser	62

S

Safety instructions	7
Sea level	67
Service	7, 54
Shutting down	63
Signal status display	15
Storage	67
Structure for equilibrating	39
Structure with conductivity detection, sequential suppression (SeS)	33
Supply voltage	7

T

Technical specifications	67
Temperature	67
Tubing connection	32