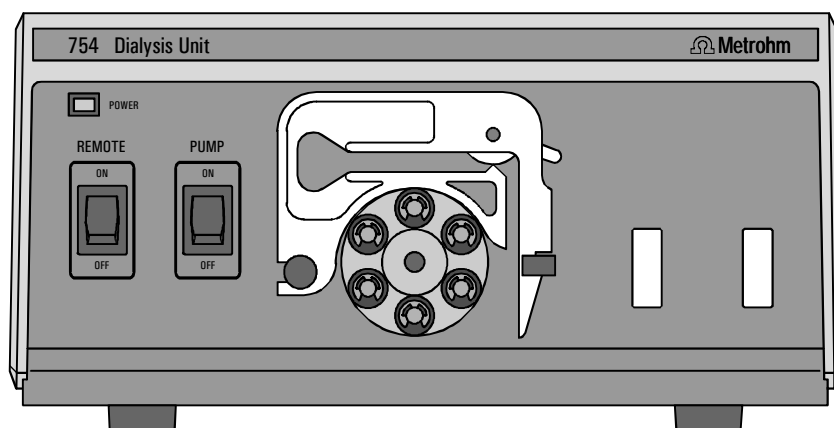


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## 754 Dialysis Unit

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8.754.1003 Instructions for Use

19.01.98 / dö

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# 1 Introduction

## 1.1 Instrument description

The **754 Dialysis Unit** is a unit for on-line sample preparation in ion chromatography permitting the use of automatic sample dialysis directly before sample injection. It consists of a dual-channel peristaltic pump for conveying the sample and acceptor solutions, and the actual dialysis cell in which the ions from the flowing sample solution are enriched in the resting acceptor solution and then injected directly into the IC system. This special **Stopped-Flow Method** (for which Metrohm has applied for a patent) means that 100% of the sample concentration can be achieved in the acceptor solution, allowing easy calibration with external standards.

The 754 Dialysis Unit can be operated manually, via the ON/OFF switch, or by remote control, via the remote interface.

**Valve B**, which is built into the 733.0020 IC Separation Center and controlled by the 732 IC Detector, is required to operate the 754 Dialysis Unit. For this variant, which is described in these Instructions for Use, the following units are required:

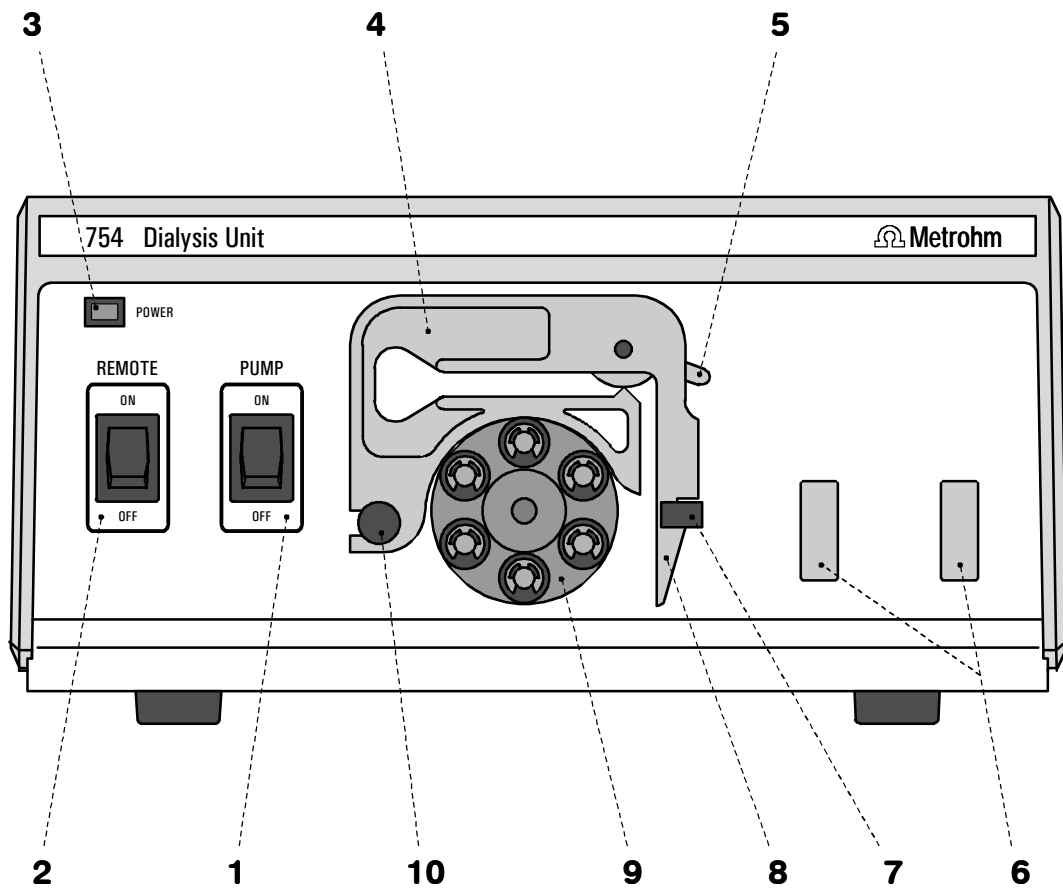
<i>Operation <u>without</u> suppressor</i>	<i>Operation <u>with</u> suppressor</i>
2.732.0010 IC Detector	2.732.0010 IC Detector
2.733.0020 IC Separation Center	2.733.0020 IC Separation Center
2.709.0010 IC Pump	2.709.0010 IC Pump
2.754.0010 Dialysis Unit	2.754.0010 Dialysis Unit
	2.753.0010 Suppressor Module

As an alternative to valve B, which is built into the IC Separation Center, an **external valve** controlled via the remote output of the 732 IC Detector can also be used. This allows the 754 Dialysis Unit to be operated in combination with the following units:

<i>Operation <u>with</u> suppressor</i>
2.732.0010 IC Detector
2.733.0030 IC Separation Center
2.709.0010 IC Pump
2.752.0010 Pump Unit
2.754.0010 Dialysis Unit
External valve

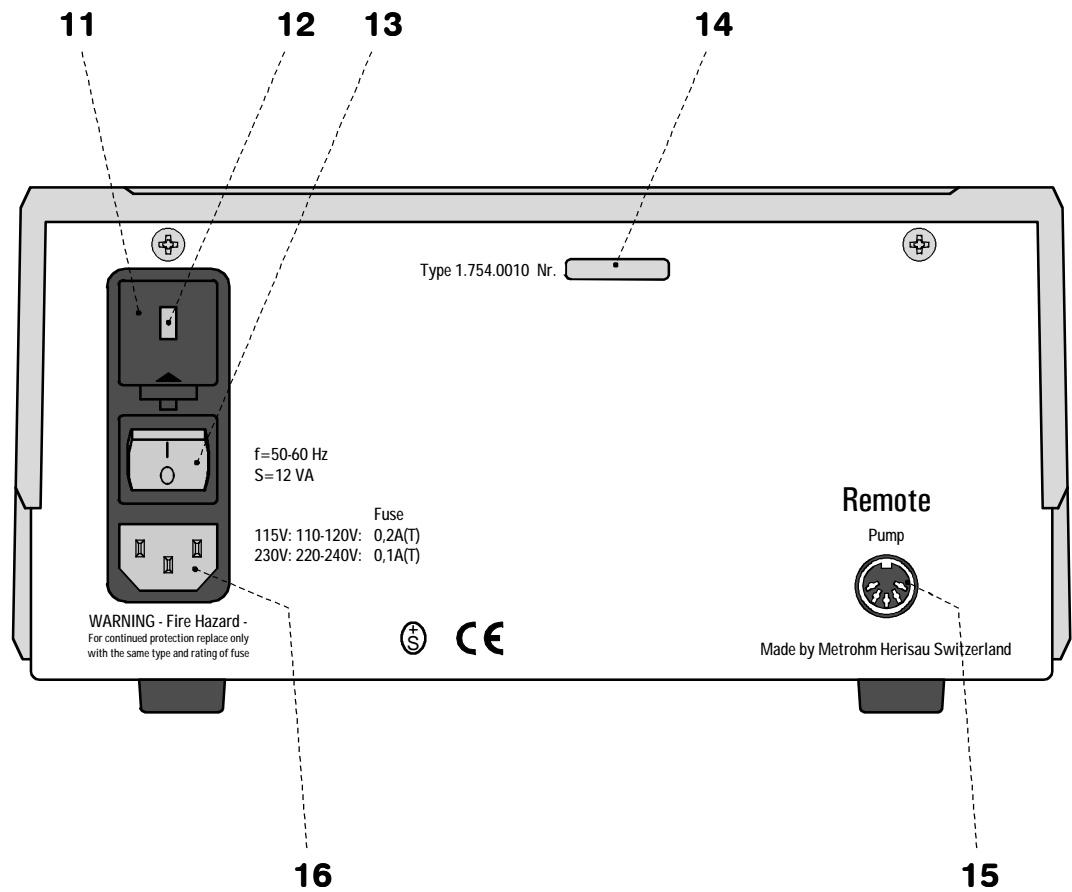
More information about this variant is available from Metrohm on request.

## 1.2 Parts and controls



**Fig. 1:** Front of the 754 Dialysis Unit (without dialysis cell)

<p><b>1 Pump ON/OFF</b> On/Off switch for the pump (manual operation mode)</p>	<p><b>6 Cell holder</b> For holding the dialysis cell</p>
<p><b>2 Remote ON/OFF</b> On/Off switch for remote control of the pump</p>	<p><b>7 Holding clamp</b> For locking the tubing cartridge into place</p>
<p><b>3 Power on lamp</b> Lights up when instrument is switched on</p>	<p><b>8 Snap-action lever</b> For releasing the tubing cartridge</p>
<p><b>4 Tubing cartridge</b> For 6.1826.0X0 pump tubing</p>	<p><b>9 Pump drive</b> Roller head with contact rollers</p>
<p><b>5 Contact pressure lever</b> For adjusting the contact pressure</p>	<p><b>10 Mounting pin</b> For attaching the tubing cartridge</p>



**Fig. 2:** Rear of the 754 Dialysis Unit

**11 Fuse holder**  
Changing the fuses, see *section 2.2*

**14 Serial number**

**12 Voltage selection insert with display of voltage**

**15 Remote interface**  
Remote I/O lines for connecting external devices (e.g. 732 IC Detector)

**13 Mains switch**  
For switching the instrument on/off:  
I = ON    0 = OFF

**16 Mains connection plug**  
Mains connection, see *section 2.2*

## 1.3 Information about the Instructions for Use



*Please read through these Instructions for Use carefully before operating the 754 Dialysis Unit. The Instructions for Use contain information and warnings to which the user must pay attention in order to assure safe operation of the instrument.*

### 1.3.1 Organization

These **8.754.1003 Instructions for Use** for the 754 Dialysis Unit provide a comprehensive overview of the installation, startup procedure, operation, fault rectification and technical specifications of this instrument. The Instructions for Use are organized as follows:



- Section 1 Introduction**  
Description of the instrument, parts and controls, safety notes
- Section 2 Installation**  
Setting up, mains connection, attachment of accessories, connection to IC system
- Section 3 Operation**  
Manual operation, operation via 732 IC Detector, dialysis procedure
- Section 4 Faults – Maintenance**  
Fault rectification, maintenance
- Section 5 Appendix**  
Technical data, standard equipment, options, warranty, declarations of conformity, index

To find the information you require about the instruments please use either the **Table of contents** or the **Index** at the back.

### 1.3.2 Notation and pictograms

The following notations and pictograms (symbols) are used in these Instructions for Use:

<PUMP>	<b>Switch or key</b>
<b>15</b>	<b>Part or control of 754</b>
<b><u>89</u></b>	<b>Part or control of 732/733</b>
Range	<b>Parameter or entry value</b> at 732 IC Detector

	<p><b>Hazard</b> This symbol draws attention to a possible danger to life or injury if the associated directions are not followed correctly.</p>
	<p><b>Warning</b> This symbol draws attention to possible damage to instruments or instrument parts if the associated directions are not followed correctly.</p>
	<p><b>Caution</b> This symbol marks important information. Read these directions before continuing.</p>
	<p><b>Comment</b> This symbol marks additional information and tips.</p>

## 1.4 Support documentation

### Application Bulletins

The «Application Bulletin» is a collection of analytical methods, application examples and literature references. Of Metrohm's approximately 200 Application Bulletins, 34 currently refer to ion chromatography. All these Application Bulletins are available on request free of charge from your Metrohm supplier.

You will find an updated list of the Application Bulletins at any time under «<http://www.metrohm.ch>».

### Application Notes

The «Application Notes» present application information in concentrated form, i.e. on maximum 2 pages. There are currently 88 Application Notes (in English) in the field of ion chromatography. You can order these free of charge from your Metrohm supplier or view them in the Internet under «<http://www.metrohm.ch>» and copy them from there.

## 1.5 Safety notes

### 1.5.1 Electrical safety

While electrical safety in the handling of the 754 Dialysis Unit is assured in the context of the specifications IEC 1010-1 (protection class I, degree of protection IP40), the following points should be noted:

- **Mains connection**



Set the **mains voltage** and check the **mains fuse** and **mains connection** in accordance with the instructions in section 2.2.

- **Opening the 754 Dialysis Unit**



To avoid all danger of coming into contact with live components do not open the instrument or remove any parts when the 754 Dialysis Unit is connected to the power supply. Always disconnect the instrument from all voltage sources before you open it and ensure that the **mains cable is disconnected from mains connection 16 !**

- **Protection against static charges**



Electronic components are sensitive to static charging and can be destroyed by discharges. Before you touch any of the components inside the 754 Dialysis Unit, you should earth yourself and any tools you are using by touching an earthed object (e.g. housing of the instrument or a radiator) to eliminate any static charges which exist.

### 1.5.2 General precautionary rules

- **Handling of solvents**



Check all pump tubings and all input and output leads periodically for possible leaks. Follow the relevant instructions regarding the handling of flammable and/or toxic solvents and their disposal.

- **Regular exchange of pump tubings**



Pump tubings constitute consumable material and must be replaced from time to time (see section 4.4). Suitable measures must be taken so that any leak which might occur in the pump tubing or connections during unattended operation will cause no damage (placing the instrument at the bottom, collection device for any liquid which may leak out).

## 2 Installation

### 2.1 Setting up the instrument

#### 2.1.1 Packaging

The 754 Dialysis Unit is supplied together with the separately packed accessories in special packagings containing shock-absorbing foam linings designed to provide excellent protection. The actual instrument is packed in an evacuated polyethylene bag to prevent the ingress of dust. Please store all these special packagings as only they can assure damage-free transport of the instrument.

#### 2.1.2 Check

After receipt, immediately check whether the shipment is complete and undamaged (compare with delivery note and list of accessories in *section 5.2*). In the case of transport damage, see instructions in *section 5.4.1 "Warranty"*.

#### 2.1.3 Location

Position the instrument in the laboratory at a location convenient for operation, free from vibrations and protected against a corrosive atmosphere and contamination by chemicals.

#### 2.1.4 Arrangement of the instruments

To make the connections with the tubing supplied, position the 754 Dialysis Unit immediately under the 733 IC Separation Center. The other units (732 IC Detector, 709 IC Pump, 753 Suppressor Module) can be arranged as required.



*Take precautions to ensure that any leaks from pump tubings or connections cannot cause more damage.*

## 2.2 Mains connection



*Follow the instructions below for connecting to the power supply. If the instrument is operated with the mains voltage set wrongly and/or wrong mains fuse there is a danger of fire!*

### 2.2.1 Setting the mains voltage

Before switching on the 754 Dialysis Unit for the first time, check that the mains voltage set on the instrument (see *Fig. 3*) matches the local mains voltage. If not, reset the mains voltage on the instrument as follows:

---

#### 1 Disconnect mains cable

Disconnect mains cable from mains connection plug **16** of the 754 Dialysis Unit.

---

#### 2 Remove fuse holder

Using a screwdriver, loosen fuse holder **11** and remove completely.

---

#### 3 Change mains voltage

Completely remove voltage selector insert **12** by hand, rotate it through 180° and reinsert it. The required mains voltage (115 or 230 V) should now be visible from the front.

---

#### 4 Check fuses

Carefully take both fuses out of fuse holder **11** and check their specifications:

**100¼120 V 0.2 A (slow-blow)** Metrohm-No. U.600.0009

**220¼240 V 0.1 A (slow-blow)** Metrohm-No. U.600.0006

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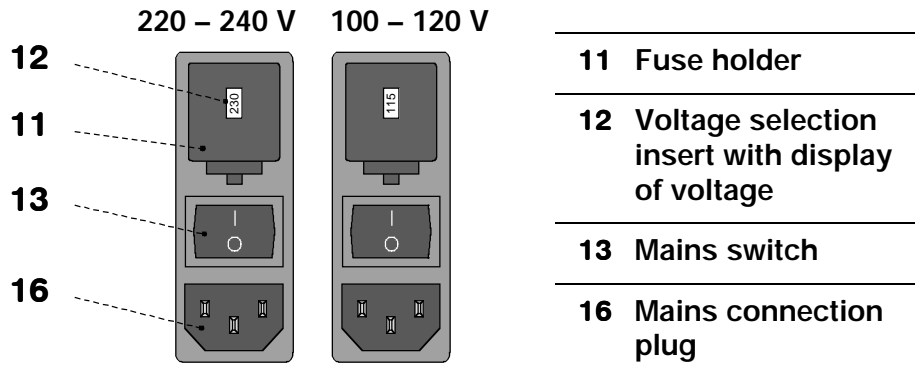
#### 5 Insert fuses

Change both fuses if necessary and reinsert in fuse holder **11**.

---

#### 6 Install fuse holder

Push fuse holder **11** back into the opening of the 754 Dialysis Unit by hand until it clicks into place properly.



**Fig. 3: Setting the mains voltage**

**2.2.2 Fuses**

Two fuses 0.2 A/slow-blow for 100...120 V or 0.1 A/slow-blow for 220...240 V are installed in the fuse holder **11** of the 754 Dialysis Unit as standard.



*To eliminate any danger of fire, ensure that the instrument is never operated with any other type of fuses!*

To check or change fuses, proceed as described in *section 2.2.1*.

**2.2.3 Mains cable and mains connection**

**Mains cable**

The instrument is supplied with one of three mains cables

- 6.2122.020 with plug SEV 12 (Switzerland, ...)
- 6.2122.040 with plug CEE(7), VII (Germany, ...)
- 6.2133.070 with plug NEMA 5-15 (USA, ...)

which are three-cored and fitted with a plug with an earthing pin. If a different plug has to be fitted, the yellow/green lead (IEC standard) must be connected to protective earth (protection class I).



*Any break in the earthing inside or outside the instrument can make it a hazard!*

**Mains connection**

Plug the mains cable into mains connection plug **16** of the 754 Dialysis Unit (see *Fig. 3*).

**2.2.4 Switching the instrument on/off**

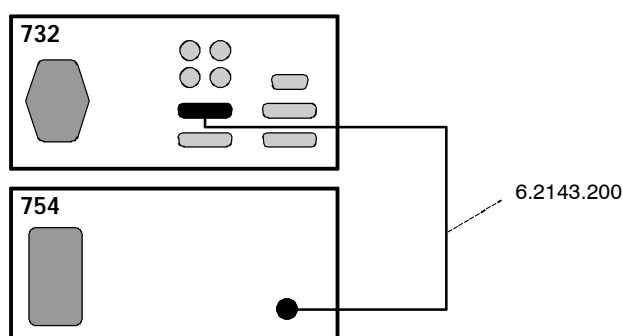
The 754 Dialysis Unit is switched on and off using mains switch **13**. When the instrument is switched on, lamp **3** lights up.

## 2.3 Attaching the accessories

### 2.3.1 Electrical connection to the 732 IC Detector

In order to allow remote operation of the pump via the 732 IC Detector, connection **15** of the 754 Dialysis Unit must be connected to the "Remote" connection of the 732 IC Detector by means of the 6.2143.200 cable as per *Fig. 4*. The switch **2** <REMOTE> on the front of the 754 Dialysis Unit must additionally be set to "ON" to permit remote operation.

If you wish to connect a second, additional unit (e.g. 752, 753, 754) to the remote interface of the 732 IC Detector, connect the Dialysis Unit 754 using the optionally available 6.2143.220 cable instead of the 6.2143.200 cable.



**Fig. 4:** Connection of 754 Dialysis Unit to 732 IC Detector

### 2.3.2 Attaching the accessories to the 733.0020 IC Separation Center

The 2.733.0020 IC Separation Center comes ready to operate with two IC columns. To operate it with the 754 Dialysis Unit, reassemble it as follows (see *Fig. 5* and *Fig. 8*):

#### 1 Dismantle accessories

- Unscrew the two sample loops mounted on valve A **18** and valve B **22**.
- Loosen the rotary nipples screwed onto the interior side of feedthrough **22** and **28**, pull the two PTFE suction tubings right out of the connections and unscrew from connection "1" of valve A **18** and valve B **22**.
- Remove the PEEK capillaries running from connection "2" of valve A **18** and valve B **22** to feedthroughs **21** and **27**.

---

**2 Connect new feedthrough**

- Using a wrench or a spanner, unscrew the nut on the interior side of feedthrough **27** and remove the feedthrough.
- Insert new 6.2756.000 tubing feedthrough in the hole and retighten the nut.

---

**3 Attach tubing to valve A**

- Screw 6.1825.210 PEEK sample loop (20 µL) to connections "3" and "6" of valve A **18** using the enclosed 6.2744.010 PEEK compression fittings.
- Screw PEEK capillary **19** (6.1831.060;  $L = 1$  m) to connection "2" of valve A **18** using a 6.2744.010 PEEK compression fitting. Pull the other end of the tubing to the back through the rear panel opening **41**.
- Screw PEEK capillary **20** (6.1831.040;  $L = 15$  cm) to connection "1" of valve A **18** using a 6.2744.010 PEEK compression fitting.

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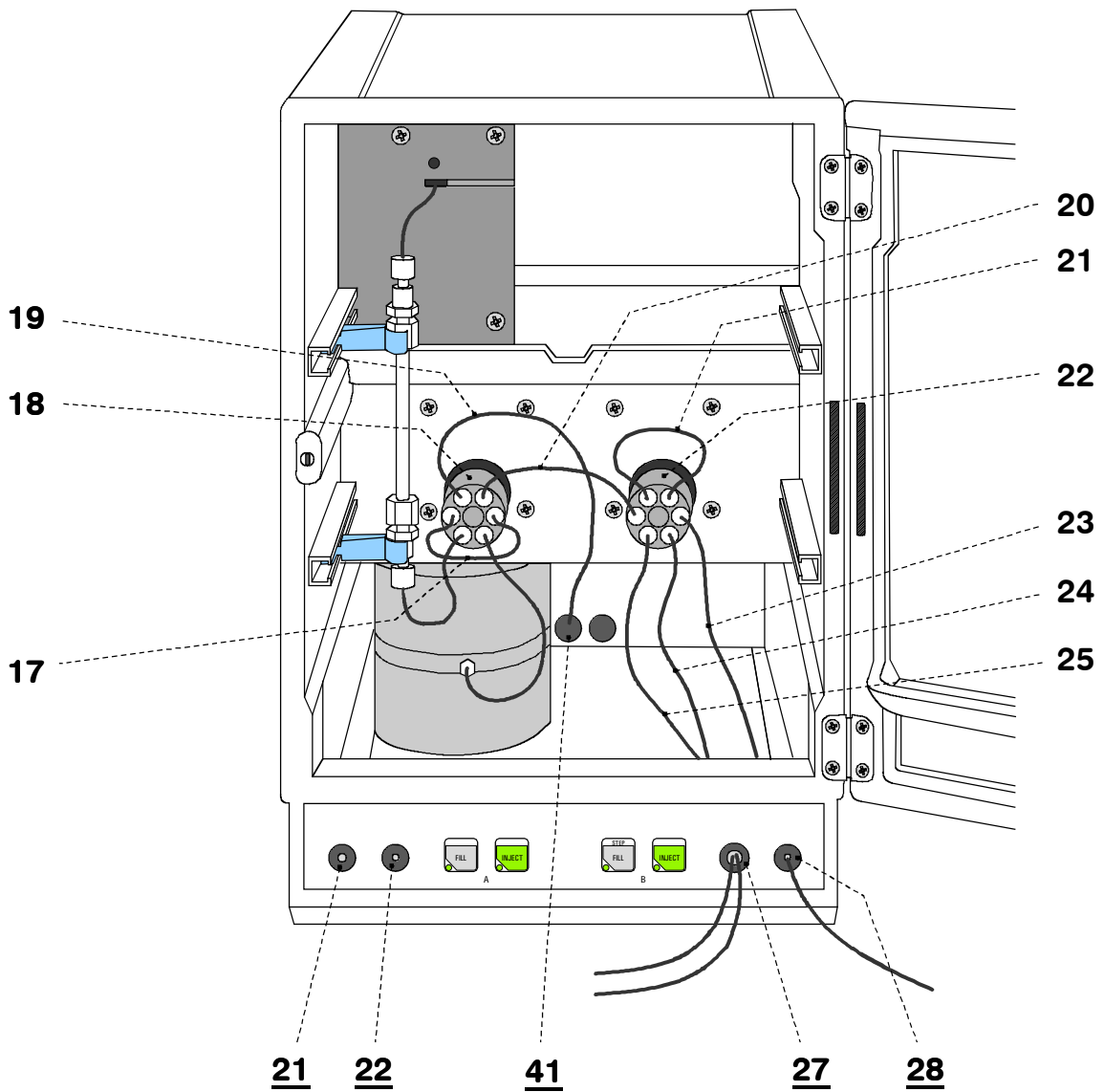
**4 Attach tubing to valve B**

- Screw the PEEK capillary **20** (6.1831.040;  $L = 15$  cm) attached to connection "1" of valve A **18** to connection "3" of valve B **22** using a 6.2744.010 PEEK compression fitting.
- Screw PEEK capillary **21** (6.1831.040;  $L = 15$  cm) to connections "1" and "2" of valve B **22** using two 6.2744.010 PEEK compression fittings.
- Screw PEEK capillary **25** (6.1831.050;  $L = 40$  cm) to connection "4" of valve B **22** using a 6.2744.010 PEEK compression fitting and pull the other end to the front through feedthrough **27**.
- Screw PEEK capillary **24** (6.1831.050;  $L = 40$  cm) to connection "5" of valve B **22** using a 6.2744.010 PEEK compression fitting and pull the other end to the front through feedthrough **27**.
- Screw PEEK capillary **23** (6.1831.050;  $L = 40$  cm) to connection "6" of valve B **22** using a 6.2744.010 PEEK compression fitting and pull the other end to the front through feedthrough **28**.

---

**5 Connecting to the 753 Suppressor Module (Option)**

- Insert the suppressor block in the 733 IC Separation Center as per the 753 Instructions for Use.
- Connect tubing to the IC column, the detector block and the waste in the 733 IC Separation Center as per the 753 Instructions for Use.
- Pull the two inlet capillaries for  $H_2SO_4$  and  $H_2O$  to the front through feedthrough **27** and connect to the 753 Suppressor Module pump tubings.



**Fig. 5:** Interior of the 733.0020 IC Separation Center

<b>17</b>	PEEK sample loop (6.1825.210; 20 mL )	<b>24</b>	PEEK capillary (6.1831.050; 40 cm)
<b>18</b>	Injection valve A	<b>25</b>	PEEK capillary (6.1831.050; 40 cm)
<b>19</b>	PEEK capillary (6.1831.060; 1 m)	<b>21</b>	Connection for syringe
<b>20</b>	PEEK capillary (6.1831.040; 15 cm)	<b>22</b>	Feedthrough
<b>21</b>	PEEK capillary (6.1831.040; 15 cm)	<b>27</b>	Feedthrough
<b>22</b>	Injection valve B	<b>28</b>	Feedthrough
<b>23</b>	PEEK capillary (6.1831.040; 15 cm)	<b>41</b>	Rear panel opening

### 2.3.3 Attaching the accessories to the 754 Dialysis Unit

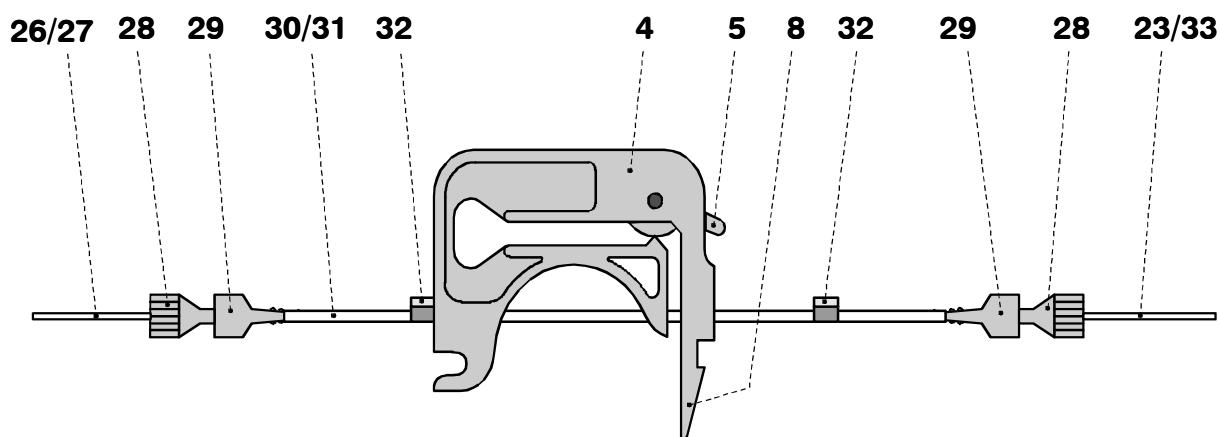
Attach the tubing cartridges with the pump tubings to the 754 Dialysis Unit. Proceed as follows (see *Fig. 5* and *Fig. 8*):

#### 9 Attach pump tubings

- Loosen both tubing cartridges **4** from the holding clamp **7** by pressing down snap-action lever **8** and remove from mounting pin **10** on 754 Dialysis Unit (see *Fig. 1*).
- Press contact pressure lever **5** on both tubing cartridges down as far as it will go.
- Insert a length of pump tubing **31** (6.1826.030) for feeding the acceptor solution into the first tubing cartridge as shown in *Fig. 6*. The orange-yellow stopper **32** must click into the corresponding holder on the left-hand side of the tubing cartridge.
- Insert a length of pump tubing **30** (6.1826.040) for feeding the sample into the second tubing cartridge. The black-black stopper **32** must click into the corresponding holder on the left-hand side of the tubing cartridge.
- Place the tubing cartridge for the acceptor solution and then the tubing cartridge for the sample on mounting pin **10** and press down on the right-hand side until snap-action lever **8** clicks into position on holding clamp **7**. Take care that no kinks are formed in the pump tubing.

#### 2 Tubing connections for acceptor solution

- Mount a PEEK compression fitting **28** (6.2744.010) on the end of the PEEK capillary **23** projecting from feedthrough **28** (see *Fig. 5*) and screw it on to coupling **29** (6.2744.030) (see *Fig. 6*).
- Push coupling **29** on to the outlet end of the pump tubing **31** (see *Fig. 6* and *Fig. 8*).
- Cut a piece of PTFE tubing (6.1803.030) to the desired length for the suction tubing **26**.
- Mount a PEEK compression fitting **28** (6.2744.010) on one end of suction tubing **26** and screw this on to coupling **29** (see *Fig. 6*).
- Push coupling **29** on to the inlet end of the pump tubing **31** (see *Fig. 6* and *Fig. 8*).
- Immerse the other end of the suction tubing **26** in a vessel containing **acceptor solution** and fix in place. The acceptor solution is usually **ultrapure water** that has previously been **degassed** (with N<sub>2</sub>, He or a vacuum).



**Fig. 6:** Installing pump tubings

<b>4</b>	<b>Tubing cartridge</b>	<b>28</b>	<b>PEEK compression fitting (6.2744.010)</b>
<b>5</b>	<b>Contact pressure lever</b>	<b>29</b>	<b>Coupling (6.2744.030)</b>
<b>8</b>	<b>Snap-action lever</b>	<b>30</b>	<b>Pump tubing (6.1826.040)</b> for conveying the sample
<b>23</b>	<b>PEEK capillary (6.1831.050)</b> for conveying the acceptor solution to valve B	<b>31</b>	<b>Pump tubing (6.1826.030)</b> for conveying the acceptor solution
<b>26</b>	<b>PTFE capillary (6.1803.030)</b> for feeding the sample in	<b>32</b>	<b>Stopper on pump tubing</b>
<b>27</b>	<b>PTFE capillary (6.1803.030)</b> for feeding the acceptor solution in	<b>33</b>	<b>PTFE capillary (6.1803.050)</b> for conveying sample to dialysis cell

### 3 Tubing connections for sample

- Mount a PEEK compression fitting **28** (6.2744.010) on the end of PTFE capillary tubing **33** (6.1803.050,  $L = 20$  cm) and screw this on to coupling **29** (6.2744.030) (see *Fig. 6*).
- Push coupling **29** on to the outlet end of the pump tubing **30** (see *Fig. 6* and *Fig. 8*).
- Cut a piece of PTFE tubing (6.1803.030) to the desired length for the suction tubing **27**.
- Mount a PEEK compression fitting **28** (6.2744.010) on one end of suction tubing **27** and screw this on to coupling **29** (see *Fig. 6*).
- Push coupling **29** on to the inlet end of the pump tubing **30** (see *Fig. 6* and *Fig. 8*).
- Immerse the other end of suction tubing **27** in the sample vessel and fix in place.



*Pump tubings are consumable material with a lifetime which depends on the contact pressure. This is why the tubing cartridges should be raised completely by loosening snap-action lever **8** on the right-hand side if the pump is to remain switched off for a considerable length of time (the set contact pressure remains unchanged).*



*The 6.1826.0X0 pump tubing is made of PVC and must not be used for rinsing with solutions which contain acetone. In such cases, rinse with different pump tubing or a different pump.*

### 2.3.4 Assembling the dialysis cell

A dialysis membrane has to be inserted before the dialysis cell can be placed inside the 754 Dialysis Unit. Proceed as follows (see *Fig. 7*):

#### 1 Prepare dialysis cell

- Extract dialysis cell **34** (6.2729.100) from its packaging and remove the four 6.2744.060 dummy stoppers.
- Using the 6.2621.070 Allen key, completely loosen the 5 screws **39**, separate top part **38** from bottom part **35** and remove sealing ring **36**.
- Thoroughly rinse the sealing ring **36**, bottom part **35** and top part **38** of the dialysis cell with ultrapure water and dry with N<sub>2</sub> or a lint-free cloth.



*Use only **ultrapure water** or **ethanol** to clean the dialysis cell; organic solvents (e.g. acetone) will cause damage to the plexiglas cell !*

#### 2 Prepare dialysis membrane

- Use the 6.2831.010 pincette to extract a new dialysis membrane **38** (e.g. 6.2714.010) from its packaging and immerse in a Petri dish containing ultrapure water for approx. 2 min until the membrane is completely saturated with water.

#### 3 Insert dialysis membrane

- Lay bottom part **35** on a paper wipe with its inside facing upwards.
- Insert sealing ring **36** in the appropriate recess in bottom part **35**.
- Using the 6.2831.010 pincette, place the wet dialysis membrane **38** (e.g. 6.2714.010) inside the sealing ring **36** on the bottom part **35**.



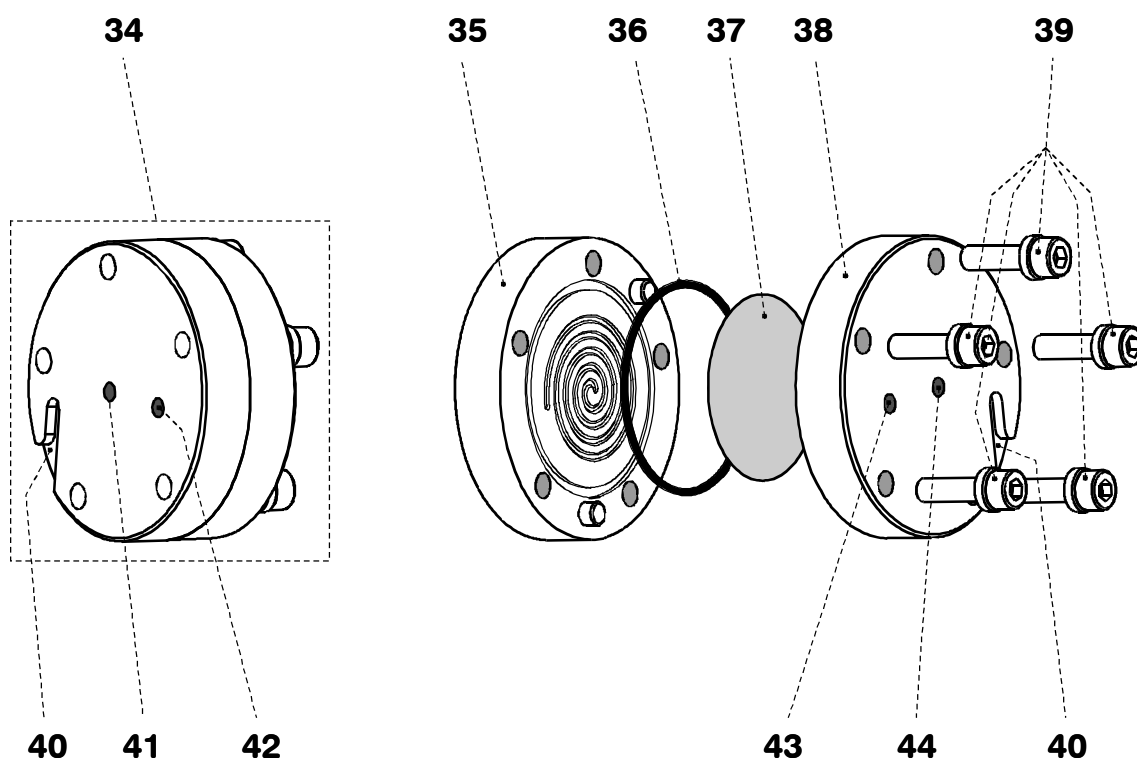
*Once saturated, take care that the dialysis membrane is not allowed to dry out, otherwise it cannot be used any more !*

#### 4 Close dialysis cell

- Place top part **38** on bottom part **35** so that both parts lie flush.
- Using the 6.2621.070 Allen key, screw the 5 screws **39** right in and tighten up.

#### 5 Attach dialysis cell

- Insert the assembled dialysis cell **34** in the cell holder **6** of the 754 Dialysis Unit.



**Fig. 7:** Assembling the dialysis cell

<b>34</b>	Dialysis cell (6.2729.100)	<b>40</b>	Slot for positioning the dialysis cell in cell holder <b>6</b>
<b>35</b>	Bottom part of the dialysis cell	<b>41</b>	Outlet for acceptor solution
<b>36</b>	Sealing ring (E.301.0111)	<b>42</b>	Inlet for acceptor solution
<b>37</b>	Dialysis membrane (e.g. 6.2714.010)	<b>43</b>	Inlet for sample solution
<b>38</b>	Top part of the dialysis cell	<b>44</b>	Outlet for sample solution
<b>39</b>	Screws V.022.6030 incl. washer 4.754.4090		

### 2.3.5 Connecting the dialysis cell

To connect the dialysis cell to the IC system proceed as follows (see *Fig. 8*):

#### 1 Tubing connections for acceptor solution

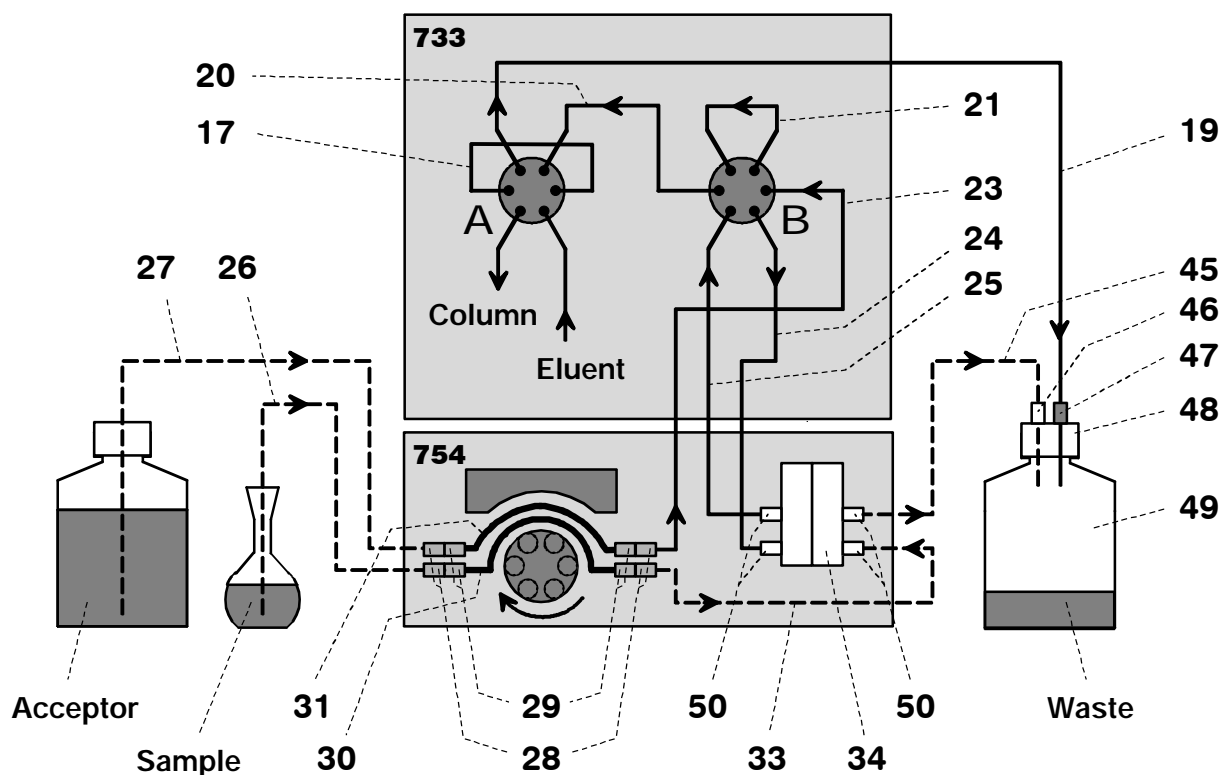
- Mount a PVDF compression fitting **50** (6.2744.000) on the end of PEEK capillary **24** projecting from feedthrough **27** (see *Fig. 5*).
- Screw PEEK capillary **24** to inlet opening **42** of the bottom part **35** of the cell (see *Fig. 7*).
- Mount a PVDF compression fitting **50** (6.2744.000) to the end of PEEK capillary **25** projecting from feedthrough **27** (see *Fig. 5*).
- Screw PEEK capillary **25** to outlet opening **41** of the bottom part **35** of the cell (see *Fig. 7*).

#### 2 Tubing connections for sample

- Mount a PVDF compression fitting **50** (6.2744.000) on the end of the PTFE capillary **33** connected to pump tubing **30**.
- Screw PTFE capillary **33** to inlet opening **43** of the top part **38** of the cell (see *Fig. 7*).
- Mount a PVDF compression fitting **50** (6.2744.000) to one end of the PTFE capillary **45** (6.1803.040;  $L = 1$  m).
- Screw PTFE capillary **45** to outlet opening **44** of the top part **38** of the cell (see *Fig. 7*).



*Do not connect the dialysis cell with anything other than the **6.2744.000 PVDF compression fittings** supplied. If 6.2744.010 PEEK compression fittings are used, stress cracks may appear in the dialysis cell !*



**Fig. 8:** Diagram of tubing connections

<b>17</b> PEEK sample loop (6.1825.210; 20 mL)	<b>30</b> Pump tubing (6.1826.040) for conveying the sample
<b>19</b> PEEK capillary (6.1831.060; 1 m) Connection Valve A – Waste	<b>31</b> Pump tubing (6.1826.030) for conveying the acceptor solution
<b>20</b> PEEK capillary (6.1831.040; 15 cm) Connection Valve A – Valve B	<b>33</b> PTFE capillary (6.1803.050; 20 cm) Connection Pump tubing – Dialysis cell
<b>21</b> PEEK capillary (6.1831.040; 15 cm) Connection at Valve B	<b>34</b> Dialysis cell (6.2729.100)
<b>23</b> PEEK capillary (6.1831.050; 40 cm) Connection Pump tubing – Valve B	<b>45</b> PTFE capillary (6.1803.040; 1 m) Connection Dialysis cell – Waste
<b>24</b> PEEK capillary (6.1831.050; 40 cm) Connection Valve B – Dialysis cell	<b>46</b> PVDF compression fitting (6.2744.000)
<b>25</b> PEEK capillary (6.1831.050; 40 cm) Connection Valve B – Dialysis cell	<b>47</b> PEEK compression fitting (6.2744.010)
<b>26</b> PTFE capillary (6.1803.030) for feeding the sample in	<b>48</b> Bottle attachment (6.1602.150)
<b>27</b> PTFE capillary (6.1803.030) for feeding in the acceptor solution in	<b>49</b> Waste bottle (6.1608.070)
<b>28</b> PEEK compr. fitting (6.2744.010)	<b>50</b> PVDF compr. fitting (6.2744.000)
<b>29</b> Coupling (6.2744.030)	

### 2.3.6 Attaching the accessories to the waste bottle

The waste bottle which receives the sample and acceptor solutions is connected to the IC system as follows (see *Fig. 8*):

---

#### 1 Attach bottle attachment

- Screw bottle attachment **48** (6.1602.150) on to waste bottle **49** (6.1608.070).

---

#### 2 Connect tubing to the dialysis cell

- Pull one end of the PTFE capillary **45** connected to the dialysis cell through a PVDF compression fitting **46** (6.2744.000), allowing 5 cm of tubing to project.
- Screw the PVDF compression fitting **46** with tubing into an opening in the bottle attachment **48** and tighten so that the tubing is held secure.

---

#### 3 Connect tubing to valve A

- Pull the free end of the PEEK capillary **19** screwed to connection "2" of valve A through a PEEK compression fitting **47** (6.2744.010), allowing 5 cm of tubing to project.
- Screw the PEEK compression fitting **47** with tubing into an opening in the bottle attachment **48** and tighten so that the tubing is held secure.



*The end of the two tubings **19** and **45** inserted in the waste bottle must be at the same height !*

### 2.3.7 Conditioning the dialysis system

Before effecting the first analysis, rinse the dialysis cell, the inserted dialysis membrane and all tubing connections with ultrapure water. Proceed as follows:

---

#### 1 Settings on the 733 IC Separation Center

- Press the <FILL> key for injection valve A on the 733 IC Separation Center. This switches injection valve A to the "FILL" position.
- Press the <FILL> key for injection valve B on the 733 IC Separation Center. This switches injection valve B to the "FILL" position.

---

#### 2 Starting up the 754 Dialysis Unit

- Immerse the two suction tubings **26** and **27** in the acceptor solution (ultrapure degassed water).
- Set the <REMOTE> switch **2** on the 754 Dialysis Unit to "OFF".
- Switch on the 754 Dialysis Unit with mains switch **13** and set the <PUMP> switch **3** to "ON".
- Adjust the contact pressure for both tubing cartridges: Press contact pressure lever **5** upwards until the solutions just start to be drawn in. Then push the contact pressure lever upwards until it clicks again to achieve the optimum contact pressure.
- Rinse the dialysis system with ultrapure water for approx. 10 min and check that the solutions flow steadily through the two tubings into the waste bottle.

---

#### 3 Conditioning the dialysis membrane

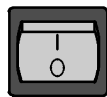
- Press the <INJECT> key for injection valve B on the 733 IC Separation Center. This switches injection valve B to the "INJECT" position.
- Rinse the dialysis system with ultrapure water for approx. 20 min. Check that the solutions flow steadily through the two tubings into the waste bottle.
- Check all tubing from the storage vessels through the tubing cartridges and the dialysis cell up to the waste containers for any leaks. If liquid escapes anywhere, tighten or replace the corresponding connection.
- If air bubbles remain in the dialysis cell, unscrew PEEK tubing **25** (Acceptor solution) and PTFE tubing **45** (sample) from outlets **41** and **44** of the dialysis cell and wait until the air bubbles disappear. Reconnect the tubings to the dialysis cell.

# 3 Operation



The 754 Dialysis Unit cannot be manually operated unless the installation has been carried out properly as described in section 2 (mains connection, attaching pump tubing and dialysis cell, connection to the IC system).

## 3.1 Manual operation



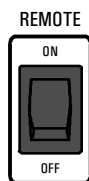
### Switch instrument on/off

The 754 Dialysis Unit is switched on and off using mains switch **13** on the rear of the instrument (see Fig. 2):

- I Instrument switched on
- 0 Instrument switched off



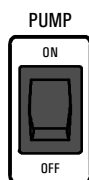
After the instrument has been switched on the power lamp **3** lights up to show that the instrument is ready for use.



### Switch off remote control of the pump

In order to allow manual operation the remote control of the pump must be switched off with switch **2**.

- ON Remote control switched on
- OFF Remote control switched off



### Switch pump on/off

The drive of the pump is switched on and off with the switch **1** <PUMP>:

- ON Pump switched on
- OFF Pump switched off

## 3.2 Operation via 732 IC Detector

### Switch instrument on/off



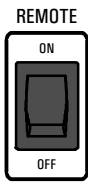
The 754 Dialysis Unit is switched on and off using mains switch **13** on the rear of the instrument (see *Fig. 2*):

- I Instrument switched on
- 0 Instrument switched off



After the instrument has been switched on the power lamp **3** lights up to show that the instrument is ready for use.

### Switch on remote control of the pump



In order to allow remote operation via 732 IC Detector, the remote control must be switched on with switch **2**.

- ON Remote control switched on
- OFF Remote control switched off

### Switch pump on/off in a program

In the 732 IC Detector the <PROGRAM> key can be used to create time programs with a maximum of 20 program steps (see *section 4.7.1 of 732/733 Manual*). The pump can be switched on or off at any program step by setting the remote output lead (lead 1 or 4 depending on the cable) to 1 (on, active, 0 V) or 0 (off, inactive, open) respectively:

#### with 6.2143.200 cable

#### with 6.2143.220 cable

Switch on:

```
>PROGRAM/edi t   XXX. X mi n
remote           1*****
```

```
>PROGRAM/edi t   XXX. X mi n
remote           ***1****
```

Switch off:

```
>PROGRAM/edi t   XXX. X mi n
remote           0*****
```

```
>PROGRAM/edi t   XXX. X mi n
remote           ***0****
```

### Switch pump on/off at an event

In the 732 IC Detector the <EVENT> key can be used to program a maximum of 4 different events (see *section 4.7.3 of 732/733 Manual*). The pump can be switched on or off at any event by setting the remote output lead (lead 1 or 4 depending on the cable) to 1 (on, active, 0 V) or 0 (off, inactive, open) respectively:

#### with 6.2143.200 cable

#### with 6.2143.220 cable

Switch on:

```
EVENT YY-MM-DD  HH:MM:SS
remote          1*****
```

```
EVENT YY-MM-DD  HH:MM:SS
remote          ***1****
```

Switch off:

```
EVENT YY-MM-DD  HH:MM:SS
remote          0*****
```

```
EVENT YY-MM-DD  HH:MM:SS
remote          ***0****
```

### 3.3 The dialysis procedure

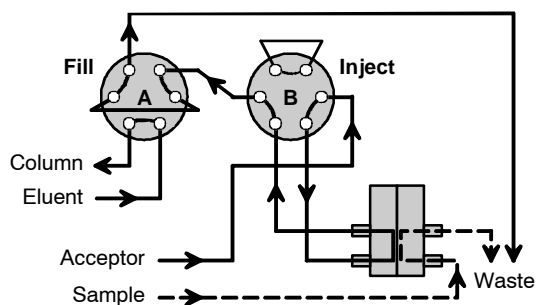
#### 3.3.1 Dialysis flow chart

Every sample dialysed with the 754 Dialysis Unit comprises the following four steps:

##### 1 Rinsing

Valve A: FILL  
Valve B: INJECT

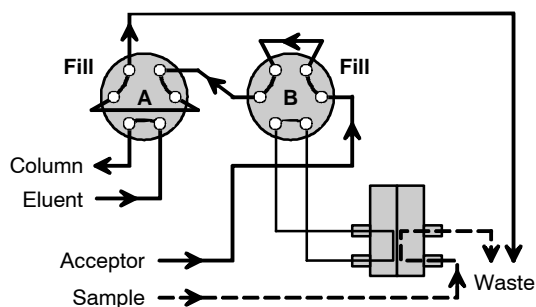
Sample channel, acceptor channel and sample loop are rinsed (rinsing time: approx. 2 min).



##### 2 Dialysis with «Stopped Flow»

Valve A: FILL  
Valve B: FILL

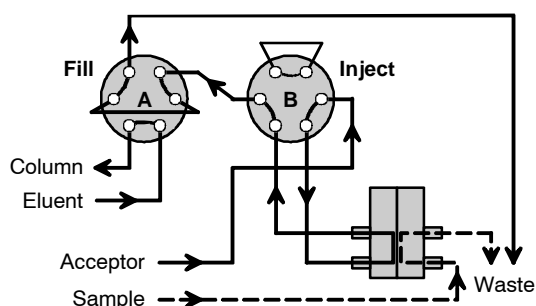
The sample is dialysed with resting acceptor solution (dialysis time: approx. 10 min).



##### 3 Transfer to sample loop

Valve A: FILL  
Valve B: INJECT

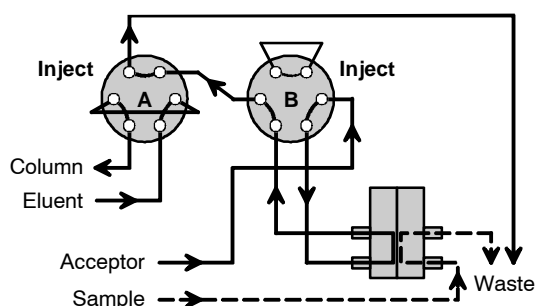
The acceptor solution enriched with ions from the sample is transferred to the sample loop (transfer time: approx. 0.4 to 0.6 min).



##### 4 Injection

Valve A: INJECT  
Valve B: INJECT

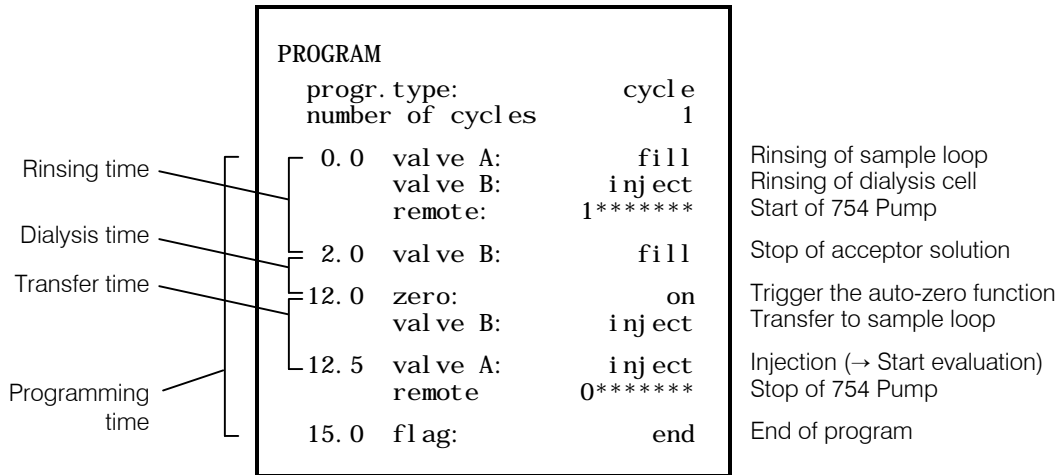
The acceptor solution enriched with ions from the sample is injected into the IC system.



### 3.3.2 Programming with the 732 IC Detector

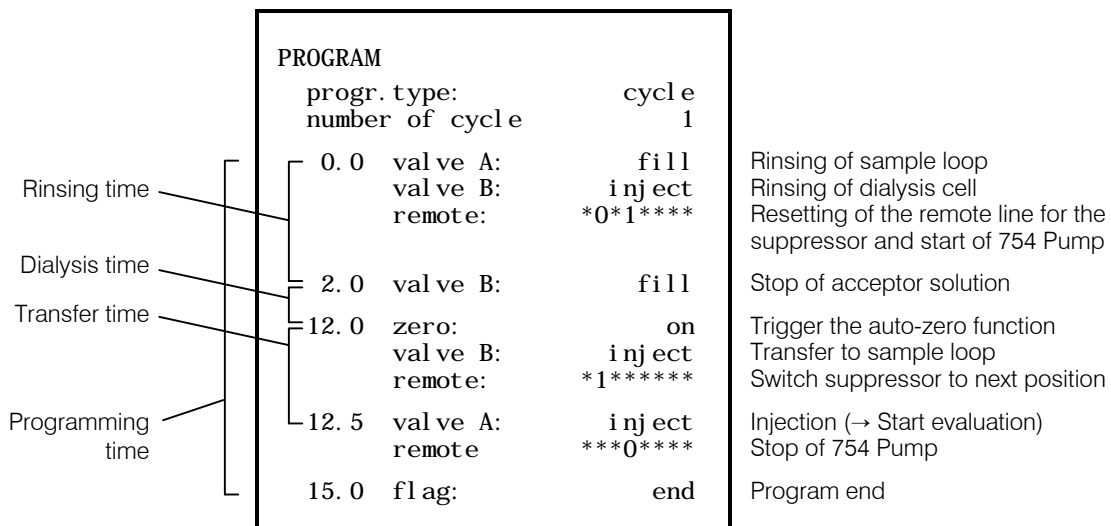
#### Program without suppression

To dialyze in an IC system without suppression a program has to be created for controlling the valves in the 733 IC Separation Center and the 754 Dialysis Unit connected with cable 6.2143.200. The following example program contains the necessary program steps.



#### Program with suppression

To dialyze in an IC system with suppression a program has to be created for controlling the valves in the 733 IC Separation Center and the 754 Dialysis Unit and 753 Suppressor Module connected with cable 6.2143.220. The following example program contains the necessary program steps.



### 3.3.3 Setting the rinsing time

A rinsing time of **2 min** is normally sufficient to ensure thorough rinsing of the sample and acceptor channels. This time can be increased if required.

### 3.3.4 Setting the transfer time

The time allowed for transferring the enriched acceptor solution to the sample loop must be set to ensure that the part of the acceptor solution with the highest concentration of ions is transferred to the sample loop. With standard accessories the optimum transfer time depends on the rate of operation of the pump; the following values can be used as a guideline:

<i>Mains frequency</i>	<i>Optimum transfer time</i>
50 Hz	0.5 min
60 Hz	0.4 min

For each analysis problem, determine the optimum transfer time by taking measurements of the individual ion concentrations in relation to the transfer time itself and verify your measurements from time to time. Proceed as follows:

#### 1 First measurement

- Set the transfer time in the program to 0.2 min and the dialysis time to 10 min (see *section 3.3.2*).
- Immerse sample suction tubing **26** in the standard with 10 mg/L of the required anion or cation.
- Start the program on the 732 IC Detector with the <PROG R/S> key. Wait until the LED in the <PROG R/S> key stops flashing, signalling the end of the measuring process.

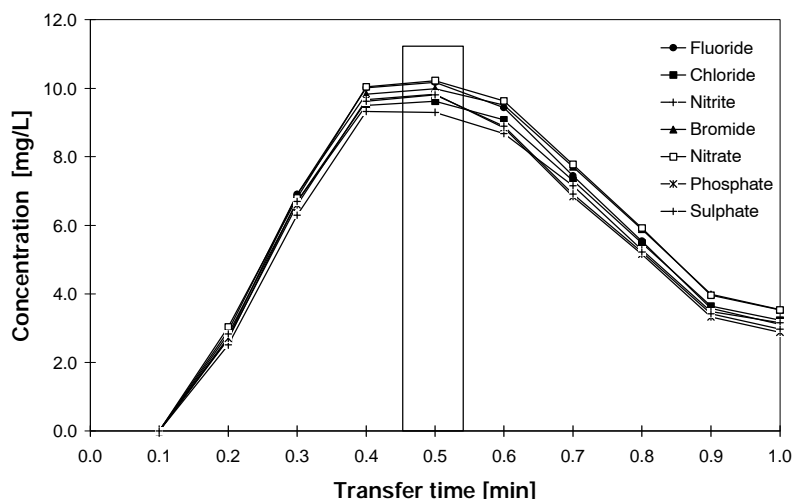
#### 2 Additional measurements

- Increase the transfer time in the program (see *section 3.3.2*) by increments of 0.1 min until the concentration measured falls again.
- Take measurements as in point **1**.

#### 3 Determining the optimum transfer time

- Record the measured peak area resp. concentration in relation to the transfer time and determine the optimum transfer time.

The Figure below shows an example of this determination process for anions using the **6.2714.010 dialysis membrane** (cellulose acetate; thickness = 115 µm; pore size = 0.2 µm) available from Metrohm. The sample was a standard solution containing 10 mg/L of each of the individual anions, which was dialysed for 10 min (mains frequency 50 Hz).



### 3.3.5 Setting the dialysis time

After calculating the optimum transfer time, determine the optimum dialysis time. This value will depend on the total ion concentration. The dialysis time with a stopped acceptor flow should be selected so that 100% of the sample concentration is achieved in the acceptor solution. For the **6.2714.010 dialysis membrane** (cellulose acetate; thickness = 115  $\mu\text{m}$ ; pore size = 0.2  $\mu\text{m}$ ) available from Metrohm, the optimum dialysis time for a total ion concentration of  $\geq 5$  mg/L is **10 min**.

If a different dialysis membrane is used, or measurements are taken with a total ion concentration of  $< 5$  mg/L, then the optimum dialysis time will have to be redetermined by measuring the recovery rate in relation to time. Proceed as follows:

#### 1 Measure the standard directly

- Switch off remote control of the 754 Dialysis Unit with the <REMOTE> key **2** (see *section 3.1*).
- Set the two valves A and B on the 733 IC Separation Center to "FILL" with keys **23** and **25**.
- Immerse suction tubing **27** in the required ion standard, which has approximately the same total ion concentration as the samples.
- Switch on the pump on the 754 Dialysis Unit with the <PUMP> key **1**.
- After approx. 2 min, switch valve A on the 733 IC Separation Center to "INJECT" with key **24** and simultaneously start the data evaluation system. In operation with the 753 Suppressor Module, the suppressor has to be rotated with the <STEP> key.
- Immerse suction tubing **27** in the acceptor solution and rinse the acceptor channel for approx. 2 min.
- Switch off the pump on the 754 Dialysis Unit with the <PUMP> key **1**.
- Switch the remote control of the 754 Dialysis Unit back on with the <REMOTE> key **2**.

---

**2 Measure the standard with dialysis**

- Set the dialysis time in the program to 5 min (see *section 3.3.2*).
- Immerse sample suction tubing **26** in the standard used in point **1**.
- Start the program on the 732 IC Detector with the <PROG R/S> key. Wait until the LED in the <PROG R/S> key stops flashing, signalling the end of the evaluation.

---

**3 Additional measurements**

- Increase the dialysis time in the program (see *section 3.3.2*) by 5 min increments until the measured values remain constant.
- Take measurements as per point **2**.

---

**4 Determine optimum dialysis time**

- Record the ratio of the peak surfaces, i.e. concentrations measured with and without dialysis in relation to the dialysis time (i.e. the recovery rate) and determine the optimum dialysis time.

**3.3.6 Setting the program time**

Set the program time so that the chromatogram can be completely recorded and evaluated within this period.

**3.3.7 Dialysis procedure**

To analyse samples using dialysis you should preferably proceed as follows:

---

**1 Prepare acceptor solution**

- To avoid malfunctions caused by air bubbles in the acceptor channel, the ultrapure water used for the acceptor solution should always be **degassed** for at least 10 min with vacuum, N<sub>2</sub> or He.

---

**2 Prepare sample**

- To prevent blockages in the sample channel, samples containing a high volume of (suspended/solid particles) should always be **centrifuged** using a table centrifuge at 10,000 rev./min for 5 min.

---

### 3 Starting up the IC System

- Switch on the 732 IC Detector, load method and set program status to *active* (see the *732/733 Manual*).
- Switch on 709 IC Pump and condition IC column (see the *709 Manual*).
- If applicable, switch on the 753 Suppressor Module and the remote control (see the *753 Manual*).
- Switch on data evaluation system (e.g. «IC Metrodata for Win95»).

---

### 4 Starting up the dialysis system

- Switch on the 754 Dialysis Unit and switch off the remote control with the <REMOTE> key **2** (see *section 3.1*).
- Immerse suction tubings **26** and **27** in the acceptor solution, switch on the pump with the <PUMP> key **1** and rinse the dialysis system with acceptor solution for approx. 10 min.
- Switch off the pump with the <PUMP> key **1** and switch on the remote control with the <REMOTE> key **2**.

---

### 5 Calibration

- Immerse sample suction tubing **26** in the standard solution.
- Start program on the 732 IC Detector with the <PROG R/S> key. The LED in the key will start to flash.
- The next standard can be measured as soon as the LED in the <PROG R/S> key stops flashing.

---

### 6 Measuring the sample

- Immerse sample suction tubing **26** in the sample solution.
- Start program on the 732 IC Detector with the <PROG R/S> key. The LED in the key will start to flash.
- The next sample can be measured as soon as the LED in the <PROG R/S> key stops flashing.

---

### 7 Rinse the dialysis system

- After completing the measurements, switch off the remote control on the 754 Dialysis Unit with the <REMOTE> key **2** (see *section 3.1*).
- Immerse sample suction tubing **26** in the acceptor solution, switch on the pump with the <PUMP> key **1** and rinse the dialysis system with acceptor solution for approx. 10 min.
- Switch off the pump with the <PUMP> key **1**.

---

### 8 Shutting down the dialysis system

- If the dialysis cell is to remain switched off for a long period of time, remove the inlet and outlet leads connecting to the dialysis cell and block openings **41**, **42**, **43** and **44** (see *Fig. 7*) with 6.2744.060 dummy stoppers.

# 4 Malfunctions – Maintenance

## 4.1 Malfunctions and their rectification

If difficulties appear with the IC system during analysis, their cause are best investigated in the order **separating column** ® **pump** ® **eluent** ® **IC system**. An overview of possible malfunctions, their causes and remedies can be found in the instruction manuals of the 732/733 IC System (*section 5.3.2*). In addition to these general malfunctions the table below contains others which might arise as a result of the operation of the 754 Dialysis Unit.

<b>Malfunction</b>	<b>Possible causes</b>	<b>Rectification</b>
<b>Insufficient or non-existing flow rate at 754 Dialysis Unit</b>	<ul style="list-style-type: none"> <li>• Contact pressure too low</li> <li>• Pump tubing faulty</li> <li>• Inlets to dialysis cell blocked</li> <li>• Sample tubing blocked by particles that are too large</li> <li>• Bacterial growth in the sample channel and dialysis cell</li> <li>• Overly narrow PTFE tubings due to excessive tightening of the compression fittings</li> </ul>	<ul style="list-style-type: none"> <li>• Set contact pressure correctly with contact pressure lever (see <i>section 2.3.3</i>).</li> <li>• Replace pump tubing (see <i>section 4.2.5</i>).</li> <li>• Replace the dialysis membrane and clean the cell (see <i>section 4.2.6</i>).</li> <li>• Replace blocked tubing; always centrifuge samples (see <i>section 3.3.7</i>).</li> <li>• Periodically replace tubings <b>26</b>, <b>30</b>, <b>33</b> and <b>45</b> for the sample channel; replace the dialysis membrane</li> <li>• Replace tubings.</li> </ul>
<b>Leakage</b>	<ul style="list-style-type: none"> <li>• Leaking compression fittings</li> </ul>	<ul style="list-style-type: none"> <li>• Tighten the compression fittings or replace if necessary.</li> </ul>
<b>Air bubbles in pump circuit</b>	<ul style="list-style-type: none"> <li>• Suction tubing is not immersed</li> <li>• Leaking compression fittings</li> <li>• Acceptor solution insufficiently degassed</li> <li>• Standing air bubbles</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure suction tubing is fully immersed in the acceptor or sample solution.</li> <li>• Tighten the compression fittings or replace if necessary.</li> <li>• Re-degas the acceptor solution.</li> <li>• Small air bubbles are not a problem. If big air bubbles occur, rinse the sample channel with degassed acceptor solution (open outlet briefly if need be).</li> </ul>
<b>Insufficient yield from dialysis</b>	<ul style="list-style-type: none"> <li>• Transfer time incorrectly set</li> <li>• Dialysis time too short (e.g. when concentration is too low)</li> <li>• Dried out or damaged dialysis membrane</li> <li>• Deposits on the dialysis membrane, recognizable from discolouring at the sample inlet</li> <li>• Unsuitable dialysis membrane</li> </ul>	<ul style="list-style-type: none"> <li>• Check optimum transfer time, especially after each change of membrane or tubing (see <i>section 3.3.4</i>).</li> <li>• Check optimum dialysis time (see <i>section 3.3.5</i>).</li> <li>• Replace dialysis membrane (see <i>section 4.2.6</i>).</li> <li>• Replace dialysis membrane (see <i>section 4.2.6</i>).</li> <li>• Use different dialysis membrane.</li> </ul>

## 4.2 Maintenance and servicing

### 4.2.1 Handling dialysis membranes

Dialysis membranes are very sensitive to contact and drying out. Avoid touching them by hand and ensure that the membrane in the cell never dries out.

The service life of a dialysis membrane is approx. 1 week under frequent use. Do not hesitate to replace the membrane if signs of decreased yield or blockages become apparent.

Please ensure you follow the instructions on how to install the dialysis cell (*section 2.3.4*), how to shut it down (*section 4.2.4*) and how to replace the dialysis membrane (*section 4.2.6*).

### 4.2.2 Care of the unit

The 754 Dialysis Unit requires proper care and attention. Excessive contamination of the instrument could possibly lead to malfunctions and a shorter service life of the inherently rugged mechanical and electronic parts.

Wipe up spilled chemicals and solvents immediately. It is especially important to protect the plug connections at the rear of the instrument (particularly the mains plug) against contamination.



*The unit has been constructed in such a way as to virtually eliminate the possibility of penetration of corrosive media into the interior of the instruments. If such a situation does occur, disconnect the mains plug of the 754 Dialysis Unit immediately to prevent extensive damage to the instrument electronics. Inform Metrohm service if your instrument has been damaged in such a way.*



*The instrument must not be opened by untrained personnel. Please comply with the safety notes in section 1.5.1.*

### 4.2.3 Maintenance by Metrohm service

Maintenance of the 754 Dialysis Unit is best done as part of an annual service performed by specialists from the Metrohm company. If work is frequently performed with caustic and corrosive chemicals, it may be necessary to shorten the interval between servicing.

The Metrohm service department is always willing to offer expert advice on the maintenance and servicing of all Metrohm instruments.

#### 4.2.4 Shutdown

If the dialysis cell is to be switched off a long period of time the acceptor and sample channels should be rinsed with ultrapure water for approx. 10 min. Then remove the inlet and outlet leads from the dialysis cell and block each of the openings **41**, **42**, **43** and **44** (see *Fig. 7*) with a 6.2744.060 dummy stopper.

#### 4.2.5 Replacing the pump tubing

Pump tubings are consumable material with a limited lifetime and should be replaced at regular intervals (approx. every 2 weeks under continuous use).

The working life of pump tubing depends to a considerable extent on the contact pressure. This is why the contact pressure must be correctly set as described in *section 2.3.3*. If the pump is to remain switched off for a lengthy period of time the tubing cartridges should be raised completely by loosening snap-action lever **8** on the right-hand side (the pre-set contact pressure remains unchanged).

To replace a pump tubing proceed as follows:

---

##### 1 Remove old pump tubing

- Press contact pressure lever **5** on the tubing cartridge down as far as it will go.
- Release tubing cartridge **4** from holding clamp **7** by pressing down snap-action lever **8** and remove from mounting pin **10** on the 754 Dialysis Unit (see *Fig. 1*).
- Remove old pump tubing.

---

##### 2 Insert new pump tubing

- Insert the new pump tubing **30** (6.1826.040) or **31** (6.1826.040) in the tubing cartridge as shown in *Fig. 6*. The stopper **32** must click into the corresponding holder on the left-hand side of the tubing cartridge.
- Place the tubing cartridge on mounting pin **10** and press down on the right-hand side until snap-action lever **8** clicks into position on holding clamp **7**. Take care that no kinks are formed in the pump tubing.

---

##### 3 Set contact pressure

- Press contact pressure lever **5** upwards until the solution just starts to be drawn in. Then press contact pressure lever upwards until it clicks once more to obtain optimal contact pressure.

## 4.2.6 Replacing the dialysis membrane

The dialysis membrane may have to be replaced in the following cases (see *section 4.1* as well):

- Reduced yield from dialysis
- Membrane has dried out, or is damaged by deposits or bacterial growth
- Irremediable blockage of the sample channel (sample can no longer be conveyed through the dialysis cell)

To replace the membrane, proceed as follows (see *Fig. 7*):

### 1 Dismantle the dialysis cell

- Unscrew the four inlet/outlet leads from the dialysis cell **34** and remove cell from cell holder **6**.
- Loosen the 5 screws **39** completely using the 6.2621.070 Allen key and separate the top part **38** from the bottom part **35**.
- Remove old dialysis membrane **37**.



*Use only **ultrapure water** or **ethanol** to clean the dialysis cell; organic solvents (e.g. acetone) will cause damage to the plexiglas cell !*

### 2 Clean dialysis cell

- Rinse the sealing ring **36**, the bottom part **35** and the top part **38** of the dialysis cell thoroughly with ultrapure water and dry with N<sub>2</sub> or a lint-free cloth.

### 3 Prepare dialysis membrane

- Take a new dialysis membrane **38** (e.g. 6.2714.010) out of its packaging using the 6.2831.010 pincette and immerse in a Petri dish containing ultrapure water for approx. 2 min until the membrane is completely saturated with water.

### 4 Insert dialysis membrane

- Place bottom part **35** on a paper wipe with the inside facing upwards.
- Insert sealing ring **36** in the appropriate recess in the bottom part **35**.
- Using the 6.2831.010 pincette, insert the wet dialysis membrane **38** (e.g. 6.2714.010) inside the sealing ring **36** on the bottom part **35**.

---

**5 Close dialysis cell**

- Place top part **38** on bottom part **35** so that both parts lie flush.
- Screw the 5 screws **39** in all the way in and tighten using the 6.2621.070 Allen key.

---

**6 Attach dialysis cell**

- Place the assembled dialysis cell **34** in cell holder **6** of the 754 Dialysis Unit.

---

**7 Connect dialysis cell**

- Screw PEEK capillary **24** to inlet opening **42** of the bottom part **35** of the cell.
- Screw PEEK capillary **25** to outlet opening **41** of the bottom part **35** of the cell.
- Screw PTFE capillary **33** to inlet opening **43** of the top part **38** of the cell.
- Screw PTFE capillary **45** to the outlet opening **44** of the top part **38** of the cell.

---

**8 Condition dialysis membrane**

- Immerse suction tubings **26** and **27** in the acceptor solution, switch on pump with the <PUMP> key **1** and rinse the dialysis system with acceptor solution for approx. 20 min. Check that the solution flows steadily from the two lines into the waste bottle.
- Check all tubings between the storage vessels, the tubing cartridges, the dialysis cell and the waste bottles for leaks. If a leak occurs anywhere, tighten or replace the connection in question.
- Switch off pump with the <PUMP> key **1**.



# 5 Appendix

## 5.1 Technical data

### Dialysis cell

<i>Material</i>	Plexiglass (polymethyl methacrylate)
<i>Solvent compatibility</i>	Water, ethanol ( <u>no</u> organic solvents!)
<i>Cell volume</i>	240 µL (from inlet to outlet opening)
<i>Diameter of membrane</i>	47 mm

### Pump

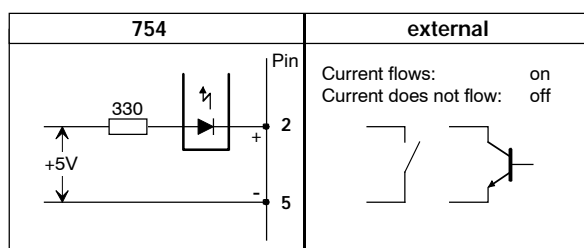
<i>Pump type</i>	2-channel peristaltic pump with rotational speed of 20/min (50 Hz) 24/min (60 Hz)
<i>Pump capacity (with water, without counterpressure)</i>	with 6.1826.030 pump tubing: typically 0.5...0.6 mL/min with 6.1826.040 pump tubing: typically 0.9...1.1 mL/min
<i>Pressure</i>	max. 1.5 bar (0.15 MPa)
<i>Pump tubing material</i>	PVC (Tygon®)

### Mains connection

<i>Mains voltage</i>	115 V: 100...120 V ± 10 % 230 V: 220...240 V ± 10 % Switchable with voltage selector in fuse holder (see section 2.2.1)
<i>Mains frequency</i>	50...60 Hz
<i>Power consumption</i>	12 VA
<i>Fuse</i>	5 mm Ø, 20 mm length 100...120 V: 0.2 A (slow-blow) 220...240 V: 0.1 A (slow-blow)

### Remote interface

<i>Purpose</i>	Remote control of pump (switching on/off)
<i>Pin assignment</i>	



### Safety specifications

<i>Construction / Testing</i>	According to IEC 1010 / EN 61010 / UL 3101-1, protection class I, degree of protection IP40
<i>Safety directions</i>	The Instructions for Use include information and warnings to which the user must pay attention in order to assure safe operation of the instrument.

### Electromagnetic compatibility (EMC)

<i>Emitted interference</i>	Standards met: EN55011 (class B), EN55022 (class B), EN50081-1
<i>Immunity to interference</i>	Standards met: IEC801-2/IEC1000-4-2 (class 4), IEC801-3/ IEC1000-4-3 (class 3), IEC801-4/IEC1000-4-4 (class 4), IEC801-6/IEC1000-4-6 (class 3), IEC1000-4-11, EN50082-2, EN60555-2

### Ambient temperature

<i>Nominal operating range</i>	+5...+45°C (at 20...80 % atmospheric humidity)
<i>Storage, transport</i>	-40...+70°C

### Housing

<i>Material of cover</i>	Polyurethane rigid foam (PUR) with fire protection for fire class UL94VO, CFC-free
<i>Material of base</i>	Steel, enamelled

### Dimensions

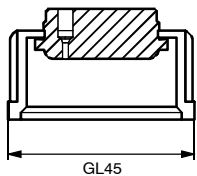
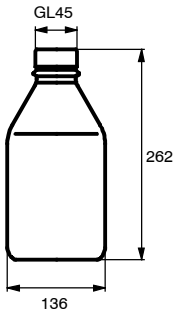
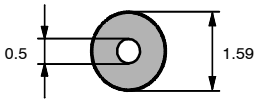
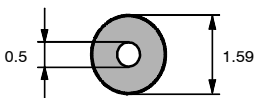
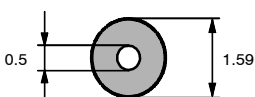
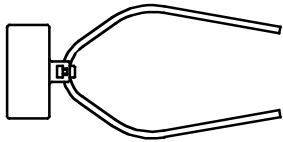
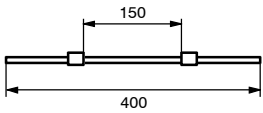
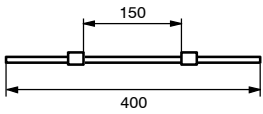
<i>Width</i>	260 mm
<i>Height</i>	129 mm
<i>Depth</i>	366 mm (without dialysis cell)
<i>Weight</i>	5.6 kg (incl. accessories)

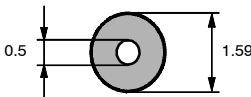
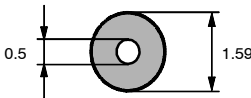
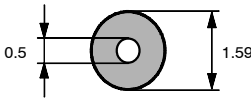
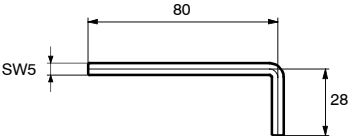
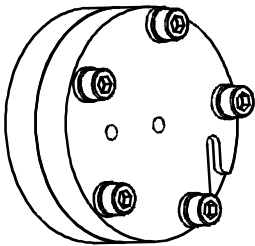
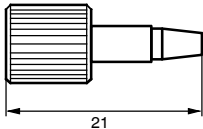
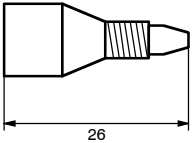
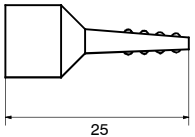
## 5.2 Standard equipment

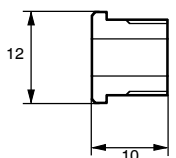
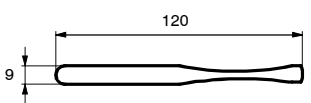


*Subject to changes!  
All dimensions are given in mm.*

The 2.754.0010 Dialysis Unit includes the following parts:

Quant.	Order No.	Description	
1	6.1602.150	<b>Bottle attachment GL45</b> for 6.1608.070 clear glass bottle	
1	6.1608.070	<b>Clear glass bottle 2 L</b> Waste bottle, with GL45 thread	
1	6.1803.030	<b>PTFE Capillary tubing</b> Length = 5 m	
5	6.1803.040	<b>PTFE Capillary tubing</b> Length = 1 m	
5	6.1803.050	<b>PTFE Capillary tubing</b> Length = 20 cm	
1	6.1825.210	<b>PEEK Sample loop 20 mL</b> For injection valve. Incl. two 6.2744.010 PEEK compression fittings	
2	6.1826.030	<b>Pump tubing</b> made of PVC (Tygon®); with 2 firmly attached orange-yellow stoppers; i.d. = 0.51 mm, e.d. = 2.27 mm	
2	6.1826.040	<b>Pump tubing</b> made of PVC (Tygon®); with 2 firmly attached black-black stoppers; i.d. = 0.76 mm, e.d. = 2.27 mm	

Quant.	Order No.	Description	
2	6.1831.040	<b>PEEK Capillary tubing</b> Length = 15 cm	
3	6.1831.050	<b>PEEK Capillary tubing</b> Length = 40 cm	
1	6.1831.060	<b>PEEK Capillary tubing</b> Length = 1 m	
1	6.2122.0X0	<b>Mains cable</b> to customer's specifications: <u>Cable socket</u> <u>Cable connector</u> Type IEC 320/C 13                  Type SEV 12 (CH...) ..... 6.2122.020 Type IEC 320/C 13                  Type CEE (7), VII (D...)..... 6.2122.040 Type CEE (22), V                  Type NEMA 5-15 (USA...) ..... 6.2122.070	
1	6.2621.070	<b>Allen Key 5 mm</b> For the dialysis cell screws	
1	6.2729.100	<b>Dialysis cell (plexiglass)</b> incl. the following accessories: 1 x E.301.0111 NBR sealing ring 5 x V.022.6030 Steel screw 5 x 4.754.4090 POM washer for screw 4 x 6.2744.060 Dummy stopper for blocking inlet and outlet openings	
1	6.2744.000	<b>PVDF Compression fitting</b> For connecting 6.1803.0X0 PTFE capillaries to the dialysis cell, set of 5 pcs	
1	6.2744.010	<b>PEEK compression fitting</b> For connecting 6.1831.0X0 PEEK capillaries and 6.1803.0X0 PTFE capillaries, set of 5 pcs	
1	6.2744.030	<b>PEEK coupling</b> Connection between 6.2744.010 PEEK compression fitting and 6.1826.0X0 pump tubing ; set of 4 pcs	

<i>Quant.</i>	<i>Order No.</i>	<i>Description</i>
1	6.2756.000	<b>Feedthrough</b> For the 733 IC Separation Center, for feeding through capillary tubings 
1	6.2831.010	<b>Pincette</b> For handling dialysis membranes 
1	8.754.1003	<b>Instructions for use (English)</b> for 754 Dialysis Unit

## 5.3 Optional accessories

<i>Order No.</i>	<i>Description</i>
6.2143.200	<b>Connecting cable</b> Connecting cable 732 IC Detector – 754 Dialysis Unit.
6.2143.220	<b>Connecting cable</b> Connecting cable 732 IC Detector – 753 Suppressor Module – 754 Dialysis Unit.
6.2714.010	<b>Dialysis membranes</b> Dialysis membranes in cellulose acetate; diameter 47 mm; thickness 115 µm; nominal pore size 0.2 µm. set of 50 pcs

## 5.4 Warranty and conformity

### 5.4.1 Warranty

The warranty on our products is limited to defects that are traceable to material, construction or manufacturing error which occur within 12 months from the day of delivery. In such cases the defects will be rectified in our workshops free of charge. Transport costs are to be paid by the customer.

For day and night operation the warranty is limited to 6 months.

Glass breakage in the case of electrodes or other parts is not covered by the warranty. Checks which we are asked to carry out during the warranty period for reasons other than material or manufacturing faults will be invoiced. For parts manufactured by third parties, insofar as these constitute an appreciable part of our instrument, the warranty stipulations of the manufacturer in question apply.




With regard to the guarantee of accuracy, the technical specifications in the instruction manual are authoritative.

With regard to defects in material, construction or design as well as the absence of guaranteed features, the purchaser has no rights or claims except those mentioned above.

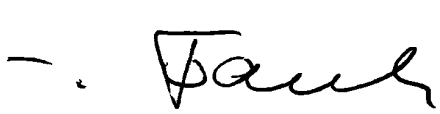

If damage of the packaging is evident on receipt of a consignment or if the goods show signs of transport damage after unpacking, the carrier must be informed immediately and a written damage report for requested. Lack of an official damage report releases Metrohm from any liability to pay compensation.

If any instruments and parts have to be returned, the original packaging should be used if at all possible. This applies above all to instruments, electrodes, burette cylinders and PTFE pistons. Before embedding them in wood shavings or similar material, the parts must be packed in a dustproof package (for instruments the use of a plastic bag is imperative). If open assemblies are enclosed in the scope of delivery that are sensitive to electromagnetic voltages (e.g. data interfaces etc.) these must be returned in the associated original protective packaging (e.g. conductive protective bag). (Exception: assemblies with built-in voltage source belong in a non-conductive protective packaging). No warranty responsibility whatsoever will be accepted by Metrohm for damage which arises as a result of non-compliance with these instructions.

**5.4.2 EU Declaration of conformity**

							
<p><b>EU Declaration of Conformity</b></p> <p>The METROHM AG company, Herisau, Switzerland hereby certifies that the instrument:</p> <p style="margin-left: 40px;"><b>754 Dialysis Unit</b></p> <p>meets the requirements of EC Directives 89/336/EWG and 73/23/EWG.</p>							
<p><b>Source of the specifications</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%; padding-left: 40px;">EN 50081-1</td> <td>Electromagnetic compatibility, basic specification Emitted Interference</td> </tr> <tr> <td style="padding-left: 40px;">EN 50082-2</td> <td>Electromagnetic compatibility, basic specification Interference Immunity</td> </tr> <tr> <td style="padding-left: 40px;">EN 61010</td> <td>Safety requirements for electrical laboratory measurement and control equipment</td> </tr> </table>		EN 50081-1	Electromagnetic compatibility, basic specification Emitted Interference	EN 50082-2	Electromagnetic compatibility, basic specification Interference Immunity	EN 61010	Safety requirements for electrical laboratory measurement and control equipment
EN 50081-1	Electromagnetic compatibility, basic specification Emitted Interference						
EN 50082-2	Electromagnetic compatibility, basic specification Interference Immunity						
EN 61010	Safety requirements for electrical laboratory measurement and control equipment						
<p><b>Description of the instrument</b></p> <p>Appliance for on-line dialysis sample preparation with 2-channel peristaltic pump</p>							
<p>Herisau, September 27, 1997</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>Dr. J. Frank Development Manager</p> </div> <div style="text-align: center;">  <p>Ch. Buchmann Production and Quality Assurance Manager</p> </div> </div>							

### 5.4.3 Certificate of conformity and system validation

<b>Certificate of Conformity and System Validation</b>	
This is to certify the conformity to the standard specifications for electrical appliances and accessories, as well as to the standard specifications for security and to system validation issued by the manufacturing company.	
Name of commodity:	<b>754 Dialysis Unit</b>
Name of manufacturer:	Metrohm Ltd., Herisau, Switzerland
Principal technical information:	Voltages: 100...120, 220...240 V Frequency: 50...60 Hz
This Metrohm instrument has been built and has undergone final type testing according to the standards:  IEC801-2/IEC1000-4-2 (class 4), IEC801-3/IEC1000-4-3 (class 3), IEC801-4/IEC1000-4-4 (class 4), IEC801-6/IEC1000-4-6 (class 3), IEC1000-4-11, EN55011 (class B), EN55022 (class B), EN50081-1, EN50082-2, EN60555-2 — <i>Electromagnetic compatibility</i> IEC1010, EN61010, UL3101-1 — <i>Security specifications</i>	
The technical specifications are documented in the instruction manual.	
Metrohm Ltd. is holder of the SQS-certificate of the quality system ISO 9001 for quality assurance in design/development, production, installation and servicing.	
Herisau, September 27, 1997	
 	
Dr. J. Frank	Ch. Buchmann
Development Manager	Production and Quality Assurance Manager

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