844 UV/VIS Compact IC

Manual
8.844.1053

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Although all the information given in this documentation has been checked with great care, errors cannot be entirely excluded. Should you notice any mistakes please send us your comments using the address given above.

Documentation in additional languages can be found on *http://products.metrohm.com* under **Literature/Technical documentation**.

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1 Introduction

1.1 Instrument description

The **844 UV/VIS Compact IC** is a PC-controlled instrument for chromatographic analysis that is available in the six following versions:

- **2.844.0010 UV/VIS Compact IC**
- **2.844.0020 UV/VIS Compact IC with post column reactor**
- **2.844.0030 UV/VIS Compact IC 844: Steel**
- **2.844.0110 UV/VIS Compact IC with column heating**
- **2.844.0120 UV/VIS Compact IC with post column reactor and column heating**
- **2.844.0130 UV/VIS Compact IC 844 with column heating: Steel**

All the necessary components for chromatography with UV/VIS detection are contained in the extremely compact housing of the 844 UV/VIS Compact IC:

- **Injection valve** – for single injections or for use with a sample changer, e.g. the 838 Advanced Sample Processor.

- **High-pressure pump** – extremely low pulsation double-piston pump with a flow range of 0.2 … 2.5 mL/min and a maximum pressure of 35 MPa (350 bar).

- **Pulsation dampener** – the pulsation dampener reliably protects the columns from damage, even with low-level pressure variations (not necessairy with versions 2.844.0030 and 2.844.0130).

- **Column heating** – the perfect insulation of the housing creates thermally stable conditions for the columns (with Versions 2.844.0110, 2.844.0120 and 2.844.0130).

- **Columns** – whether anion columns, cation columns or separating columns for organic acids – they all find space in the column compartment of the 844 UV/VIS Compact IC.

- **Post column reactor** – in the post column reactor the eluate from the column and a reagent delivered by a peristaltic pump are mixed and transported to the detector. In this way ions that cannot be detected are converted into (optically) detectable species (with Versions 2.844.0020 and 2.844.0120).

- **UV/VIS detector** – for the determination of transitional metals with post column derivation, chromate, bromate, nitrite and nitrate in strongly polluted waters, as well as various organic ions.

The two steel versions 2.844.0030 and 2.844.0130 are used for HPLC applications. There is an addittional componet of stel versions:.

- Gas-Sensor – the gas-sensor disrupts power supply, whenever sovent concentration gets too high.

The **operation** of the 844 UV/VIS Compact IC takes place via a PC connected to the RS232 interface with the help of the «**IC Net**» control and evaluation program. This PC program can be used to create systems for recording and evaluating chromatograms. Time programs can also be created in which a large number of instrument functions can be triggered for each program step. It is also possible to use programmable signals to control external instruments via the remote interface.

The «**IC Net**» operating software meets all the requirements you could place today on a modern integration software: single or multi-point calibration, internal or external standard, selectable algorithms for non-linear calibration, various integration modes with integration parameters and integration events, different methods for peak recognition, peak editor, free scaling, superimposing several chromatograms, use of sample tables and batch reprocessing; a powerful and GLP-conform report generator with output interfaces for monitor, printer and external databases.

The independent «Autodatabase» PC program supplied can be used to save and handle results and chromatograms produced by the «**IC Net**» program in a database. With «Autodatabase» data can be sorted, filtered and searched with the help of different criteria. In addition, data and curves can be printed out according to user-defined report templates.

The **«IC Net»** software can be configured and used in order to comply with the Electronic Records and Signatures Rule, known as **21 CFR Part 11**, established by the U.S. Food and Drug Administration (**FDA**). For this purpose the program contains password protection, user administration, electronic signatures, audit trail and administration of methods and results in databases. To use the 21 CFR Part 11 features of **«IC Net»** the operating system **Windows 2000** or **Windows XP** with **NTFS** file system is required.

1.2 Parts and controls

In this Section you will find the numbers and designations of the parts and controls of the 844 UV/VIS Compact IC. The numbering applies throughout the Instructions for Use, i.e. bold numbers in the text (e.g. ***4****) refer to the parts and controls illustrated here.*

1.2.1 Front

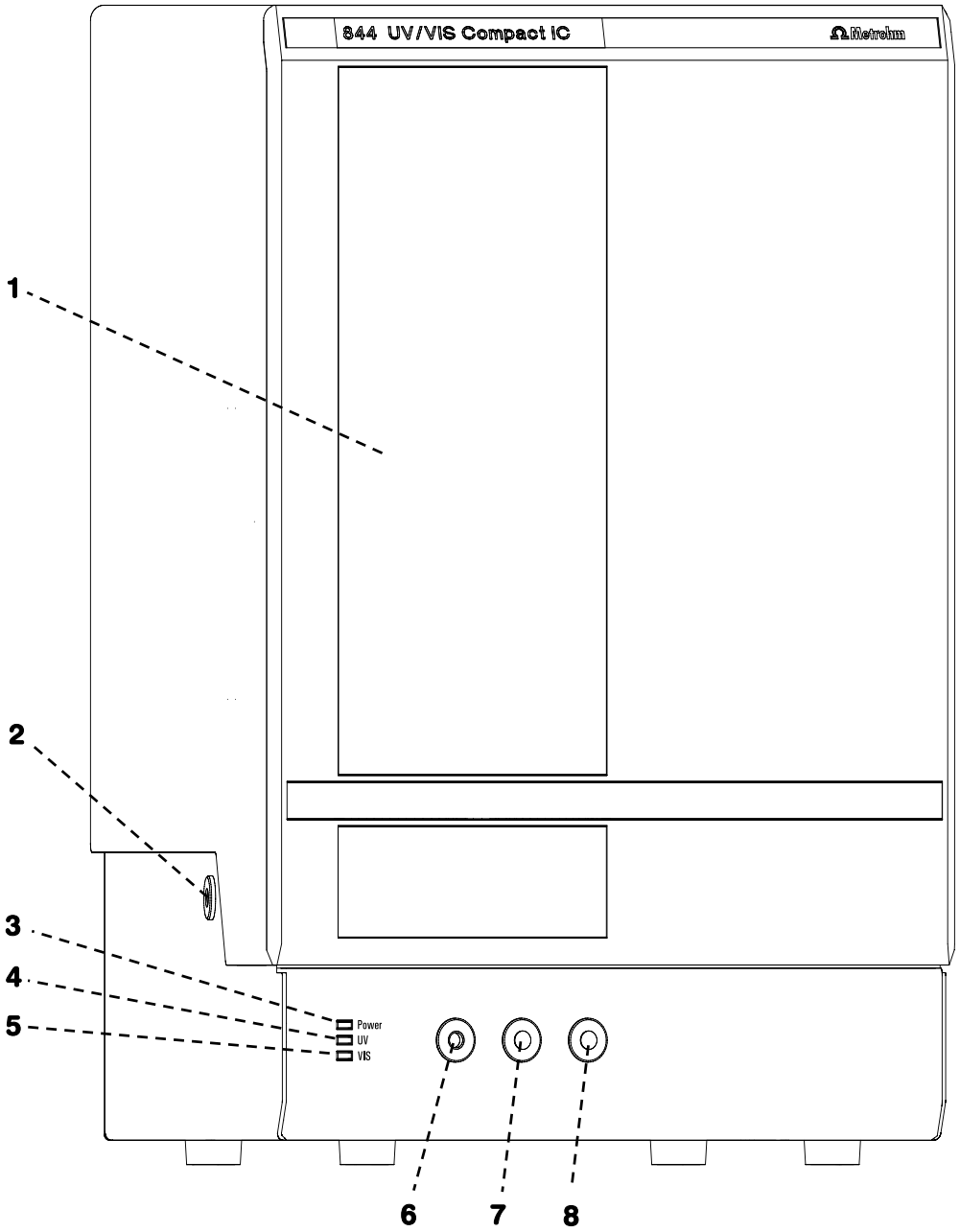


Figure 1: Front 844 UV/VIS Compact IC

1 Door to inner compartment

2 Feedthrough
for eluent, sample, waste, reagent...

3 LED "Power"
lights up when the instrument is switched on.

4 LED "UV"
lights up when the UV lamp is on.

5 LED "VIS"
lights up when the VIS lamp is on.

6 Connection purge valve

7 Connection for 6.2816.020 syringe
for aspiration of the sample

8 Feedthrough
for eluent, sample, waste, reagent...

1.2.2 Rear panel

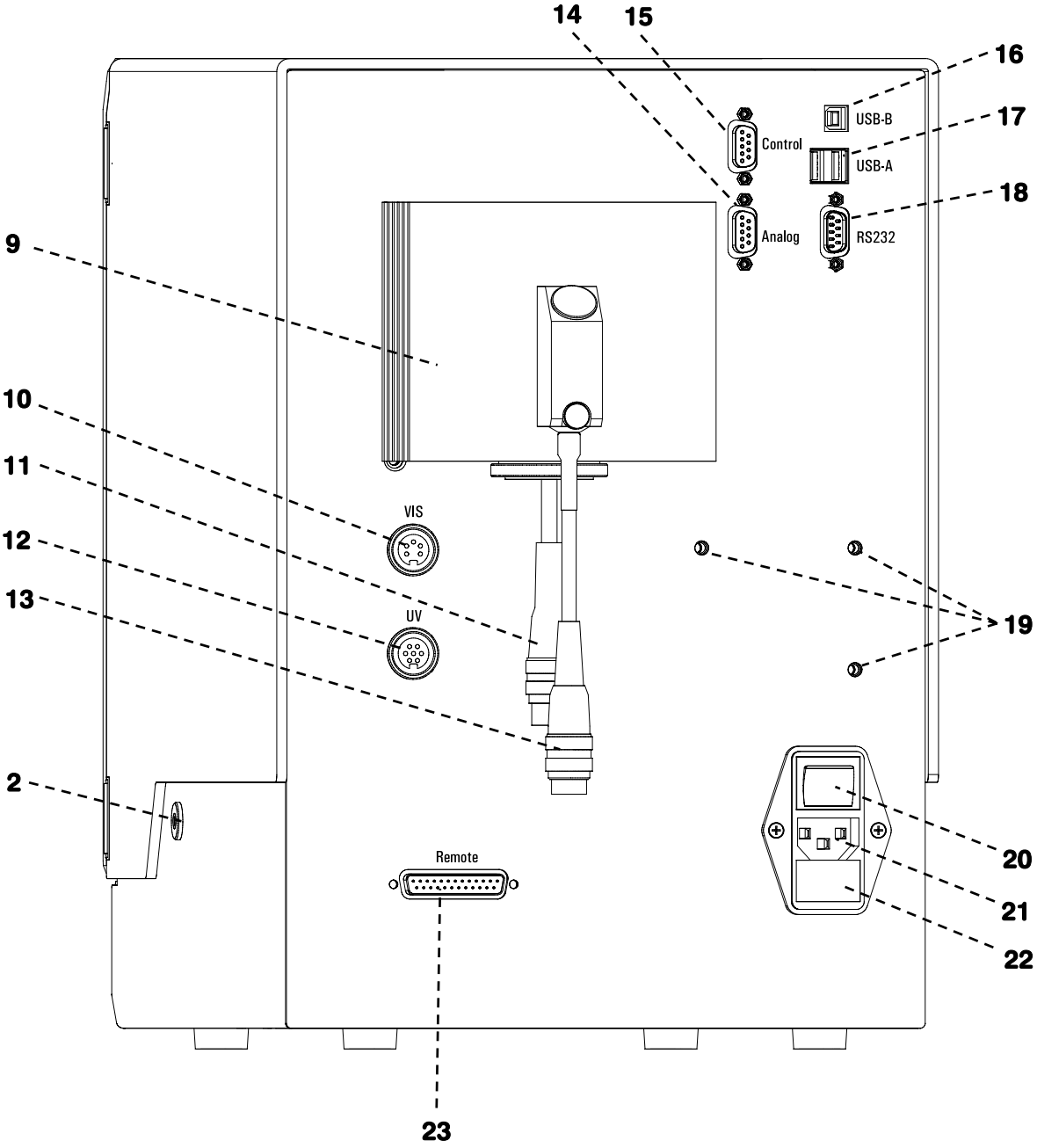


Figure 2: Rear 844 UV/VIS Compact IC

2 Feedthrough
for eluent, sample, waste, reagent...

9 Lamp cooling housing

10 VIS lamp connection
for VIS lamp connection cable **13**

11 UV lamp connection cable

12 UV lamp connection
for UV lamp connection cable **11**

13 VIS lamp connection cable

14 Analog output
output for analog signal

15 Control input
for control by other instruments

16 USB-B connection

17 USB-A connection

18 RS232 interface
PC connection

19 Transport security screws
to secure the pump head when the instrument is transported

20 Mains switch
to switch instrument on and off:
I = ON 0 = OFF

21 Mains connection plug
Mains connection, see *Section 2.4*

22 Fuse holder
Changing the fuses, see *Section 2.4*

23 Remote interface
Remote-I/O lines for connection of external devices

1.2.3 Interior PEEK versions

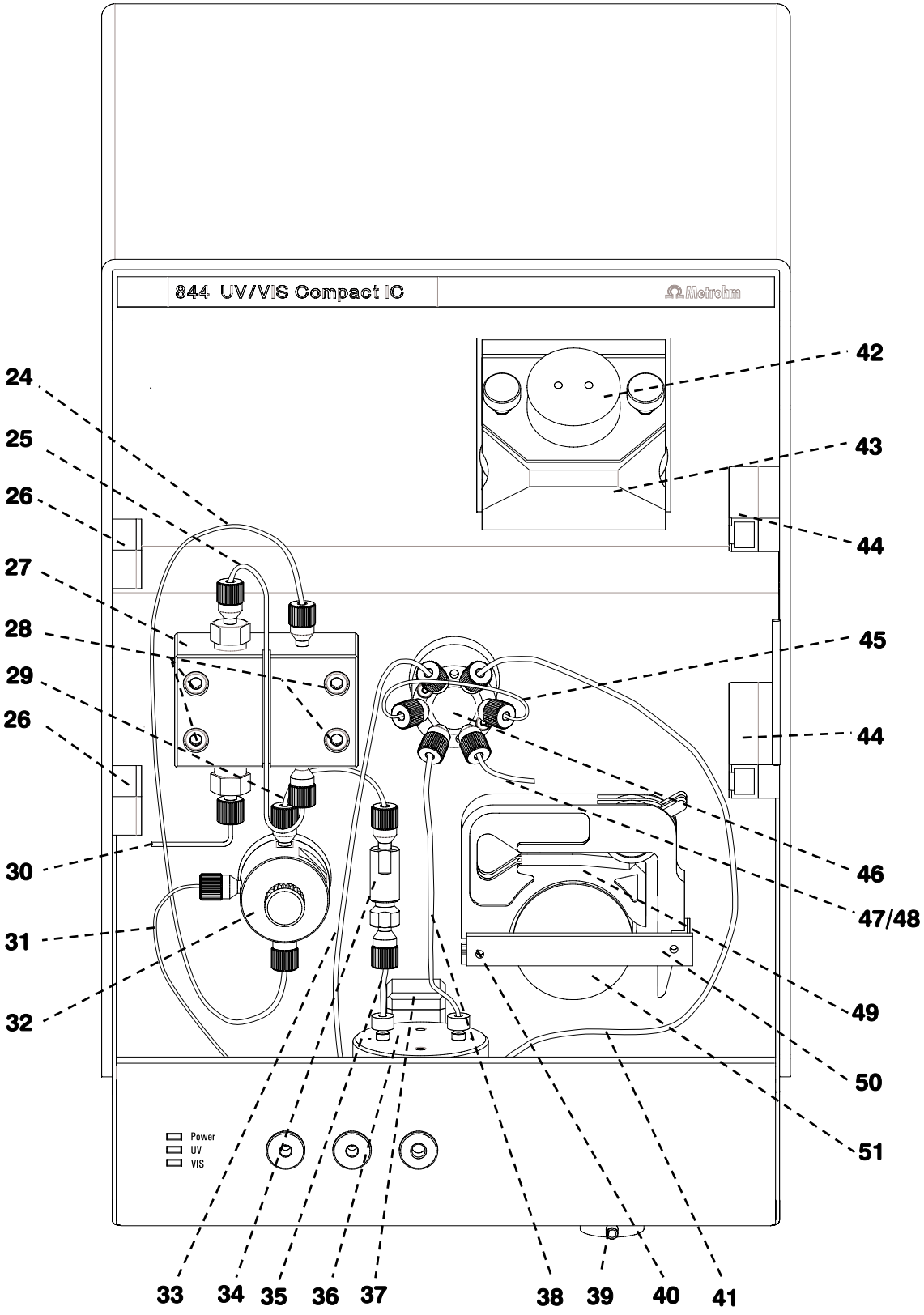


Figure 3: Interior PEEK versions

24 Connection capillary
Connection pump head – purge valve, fixed mounting

25 Connection capillary
in pump head, fixed mounting

26 Magnetic mounting rail for column heating

27 Pump head (6.2824.100)

28 Fastening screws
for pump head **27**

29 Connection capillary
from purge valve to Filter unit PEEK.
6.1831.010 PEEK capillary,
length L = 13 cm

30 Aspirating capillary
Connection for 6.1834.010 aspirating tubing

31 Connection capillary
from purge valve to connection **6**

32 Purge valve

33 Connection capillary to syringe
(with manual injection)
6.1803.020 PTFE tubing,
length L = 30 cm

34 Filter unit PEEK (6.2821.120)

35 Connection capillary
from Filter unit PEEK to Pulsation dampener.
6.1831.010 PEEK capillary,
length L = 13 cm

36 Pulsation dampener (6.2620.150)

37 Leak detector

38 Inlet capillary for injection valve
PEEK capillary 6.1831.010,
length L = 24 cm

39 Connection for drainage tubing
for draining off escaped liquid

40 Mounting pin
for attaching the tubing cartridges

41 Aspirating tubing
for sample;
PTFE-tubing 6.1803.020

42 Flow-through cell PEEK 6.2839.130

43 UV/VIS detector

44 Mounting rail
for 6.2027.0X0 Column holder, and 6.2057.050 PCR holder

45 Sample loop
PEEK sample loop

46 Injection valve

47 6.1831.110 Column inlet capillary
for column connection without column heating.
6.1831.110 PEEK capillary,
length L = 30 cm

48 6.1831.100 Column inlet capillary
for column connection with column heating.
6.1831.100 PEEK capillary,
length L = 1 m

49 Peristaltic pump
for operating the post column reactor

50 Holding clamp
for locking the tubing cartridge into place

51 Pump drive
roller head with contact rollers

1.2.4 Interior Steel versions

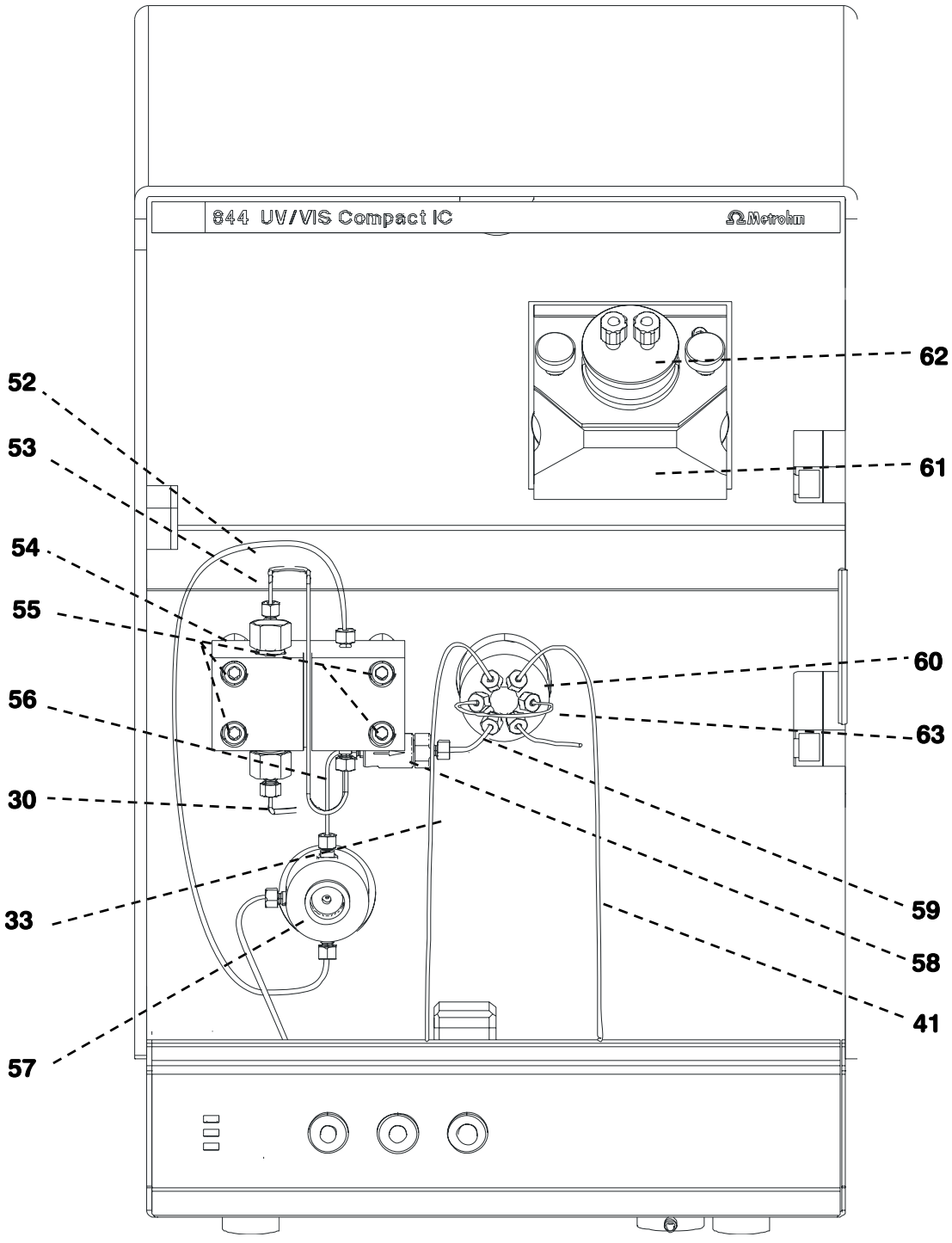


Figure 4: Interior Steel Versions

52 Steel connection capillary
Connection steel pump head – steel purge valve, fixed mounting

53 Steel connection capillary
in pump head, fixed mounting

54 Steel pump head 6.2824.040

55 Steel fastening screws
for steel pump head **54**

56 Steel connection capillary
Steel capillary 6.2620.020 from steel purge valve to steel filter unit.

57 Steel purge valve

58 Steel filter unit 6.2620.180

59 Steel connection capillary
Steel capillary 6.2620.020 from Steel filter unit to steel injection valve.

60 Steel Injection valve

61 Steel UV/VIS detector

62 Steel flow-through cell 6.2839.100

63 Steel sample loop 6.2620.110

1.3 Information on the Instructions for Use

Please read through these Instructions for Use carefully before you put the 844 UV/VIS Compact IC into operation. 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 **Instructions for Use 8.844.1053** for the 844 UV/VIS Compact IC provide a comprehensive overview of installation, startup procedure, operation, fault rectification and technical specifications of this instrument. The Instructions for Use are organized as follows:

Sect. 1 Introduction
General description of instrument, parts and controls and safety notes

Sect. 2 Installation
Installation of instrument, accessories, external devices and software

Sect. 3 Operation
Introduction to the operation

Sect. 4 Notes - Maintenance - Faults
Notes on ion chromatography, maintenance, fault rectification, diagnostic tests, validation

Sect. 5 Appendix
Technical data, standard equipment, options, warranty, declarations of conformity, index

To find the required information on the instruments, use either the **Table of contents** or the **Index** at the back.

As a supplement to the Instructions for Use, the **Metrohm Monograph 8.792.5003 "Practical Ion Chromatography"** is also supplied. This provides an introduction to the theoretical fundamentals and general information about determinations.

1.3.2 Notation and pictograms

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

Fill	**Menu item, parameter or entry value** in the software
SYSTEM STATE	**Program window** in the software
<OK>	**Button** in the software
26	**Part or control of 844**
	**Hazard** This symbol draws attention to a possible danger to life or of injury if the associated directions are not followed correctly.
	**Warning** This symbol draws attention to possible damage to instruments or instrument parts if the associated directions are not followed correctly.
	**Caution** This symbol marks important information. First read the associated directions before you continue.
	**Comment** This symbol marks additional information and tips.

1.4 Safety notes

1.4.1 Electrical safety

While electrical safety in the handling of the 844 UV/VIS Compact IC is assured in the context of the specifications EN / IEC 61010-1 (protection class I, degree of protection IP40), the following points should be noted:

- **Mains connection**

*Setting of the **mains voltage**, checking the **mains fuse** and the **mains connection** must be effected in accordance with the instructions in Section 2.4.*

- **Opening the 844 UV/VIS Compact IC**

*If the 844 UV/VIS Compact IC is connected to the power supply, the instrument must not be opened nor must parts be removed from it, otherwise there is a danger of coming into contact with components which are live. Therefore always disconnect the instrument from all voltage sources before you open it and ensure that the **mains cable is disconnected from mains connection 21** !*

- **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 844 UV/VIS Compact IC, you should ground yourself and any tools you are using by touching a grounded object (e.g. housing of the instrument or a radiator) to eliminate any static charges which exist.

1.4.2 General precautionary rules

- **Handling of solvents**

Check all lines of the IC system periodically for possible leaks. Follow the relevant instructions regarding the handling of flammable and/or toxic solvents and their disposal.

1.4.3 Recycling and disposal

This product is covered by European Directive 2002/96/EC, WEEE – Waste from Electrical and Electronic Equipment.

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

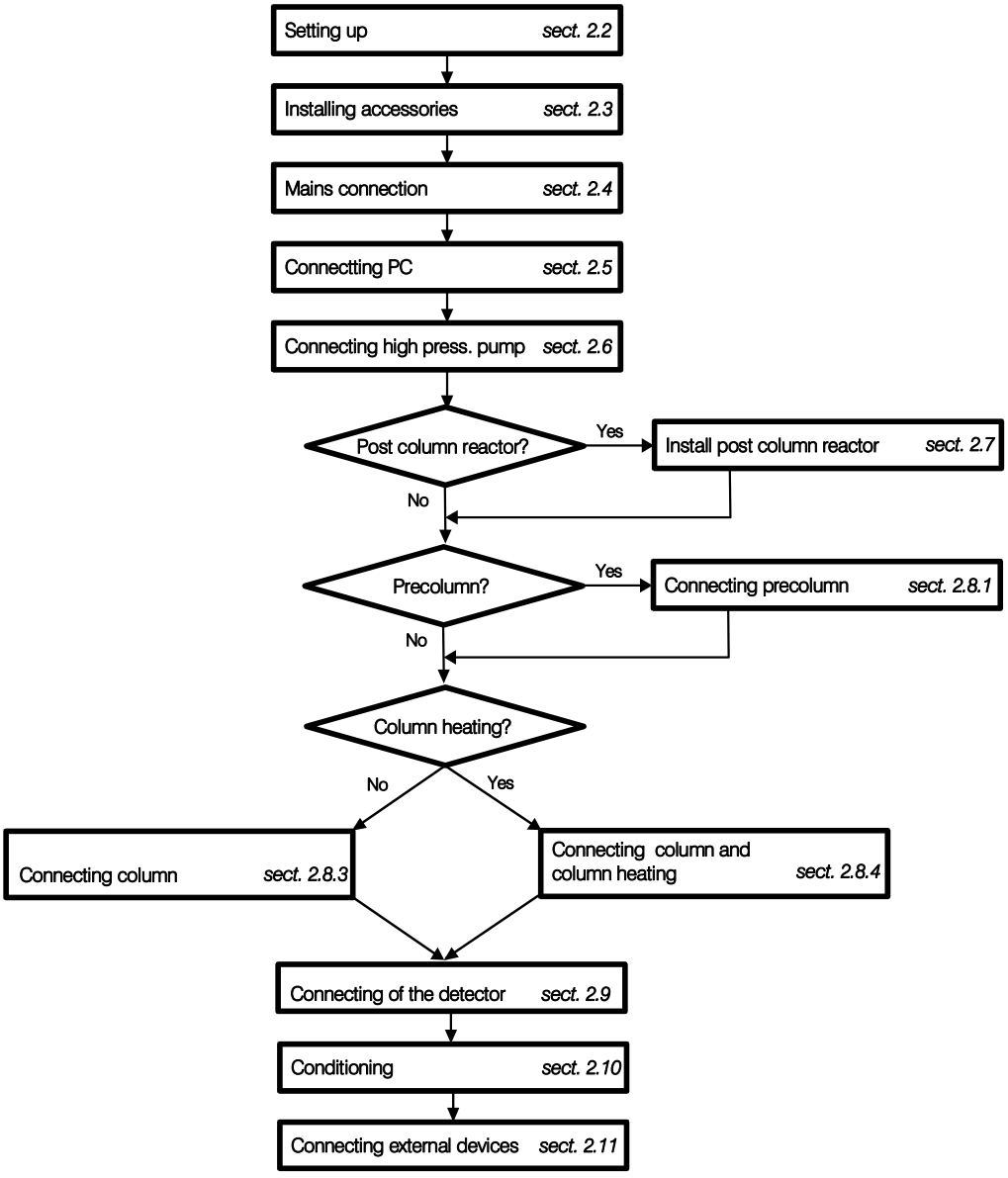
More details about the disposal of your old equipment can be obtained from your local authorities, from waste disposal companies or from your local dealer.

2 Installation

2.1 Overview

2.1.1 Flow chart

The following flow chart provides an overview of all installation work. You will find more detailed information in the relevant Sections.



2.1.2 Connections in the 844 UV/VIS Compact IC

The following illustrations show the internal connections in the 844 UV/VIS Compact IC in schematic form. The meanings of the various numbered components are given in the detailed illustrations and descriptions in Sections *2.2 – 2.11*.

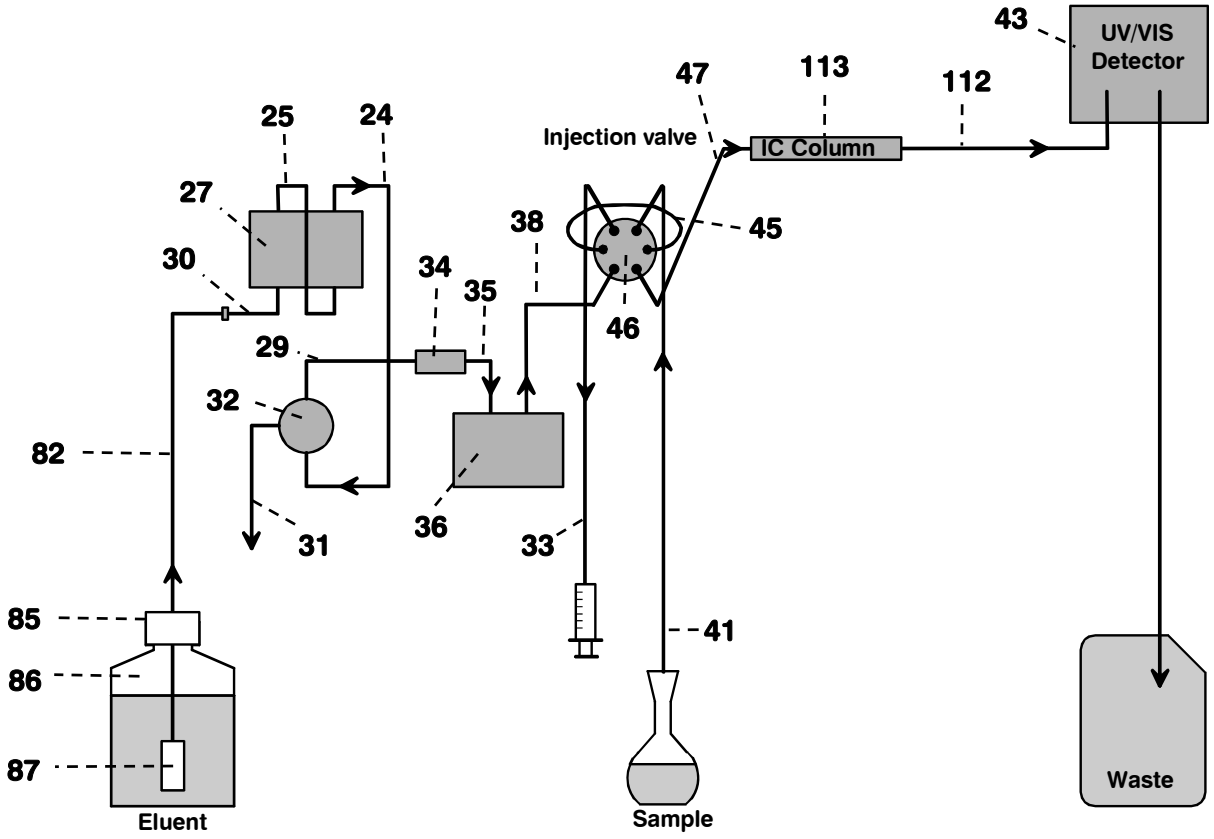


Figure 5: Connecting diagram for 844 UV/VIS Compact IC 2.844.0010

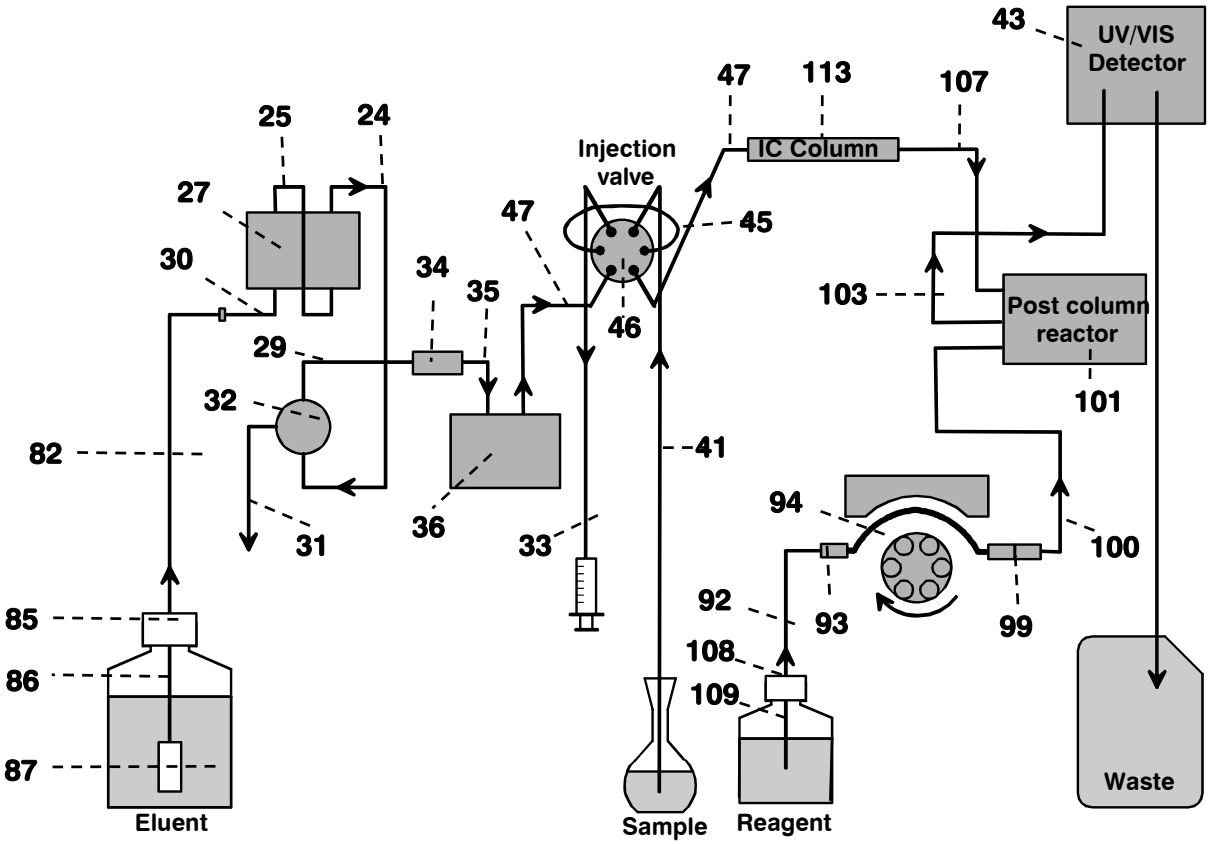


Figure 6: Connecting diagram for 844 UV/VIS Compact IC 2.844.0020 with Post column reactor

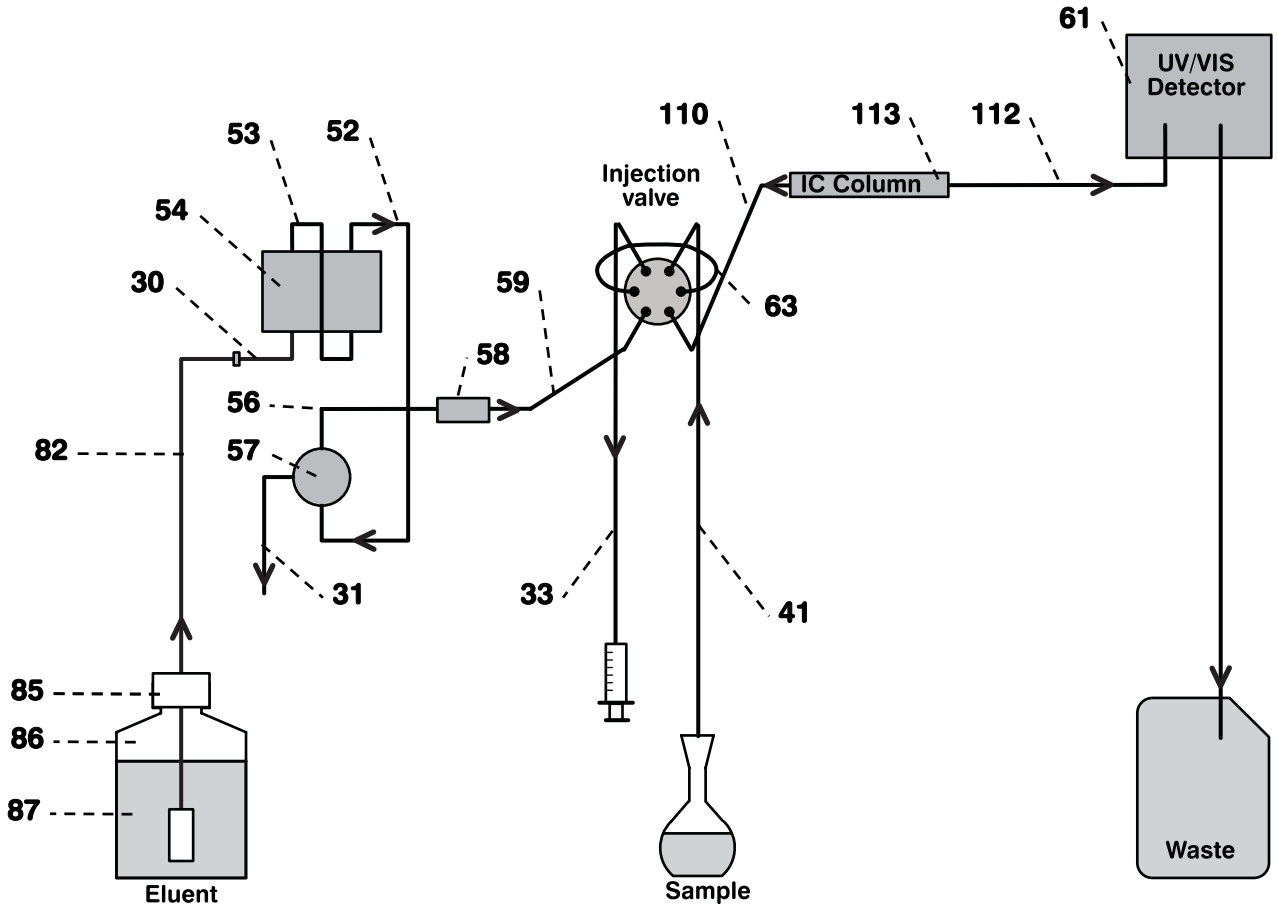


Figure 7: Connecting diagram for 844 UV/VIS Compact IC 2.844.0030

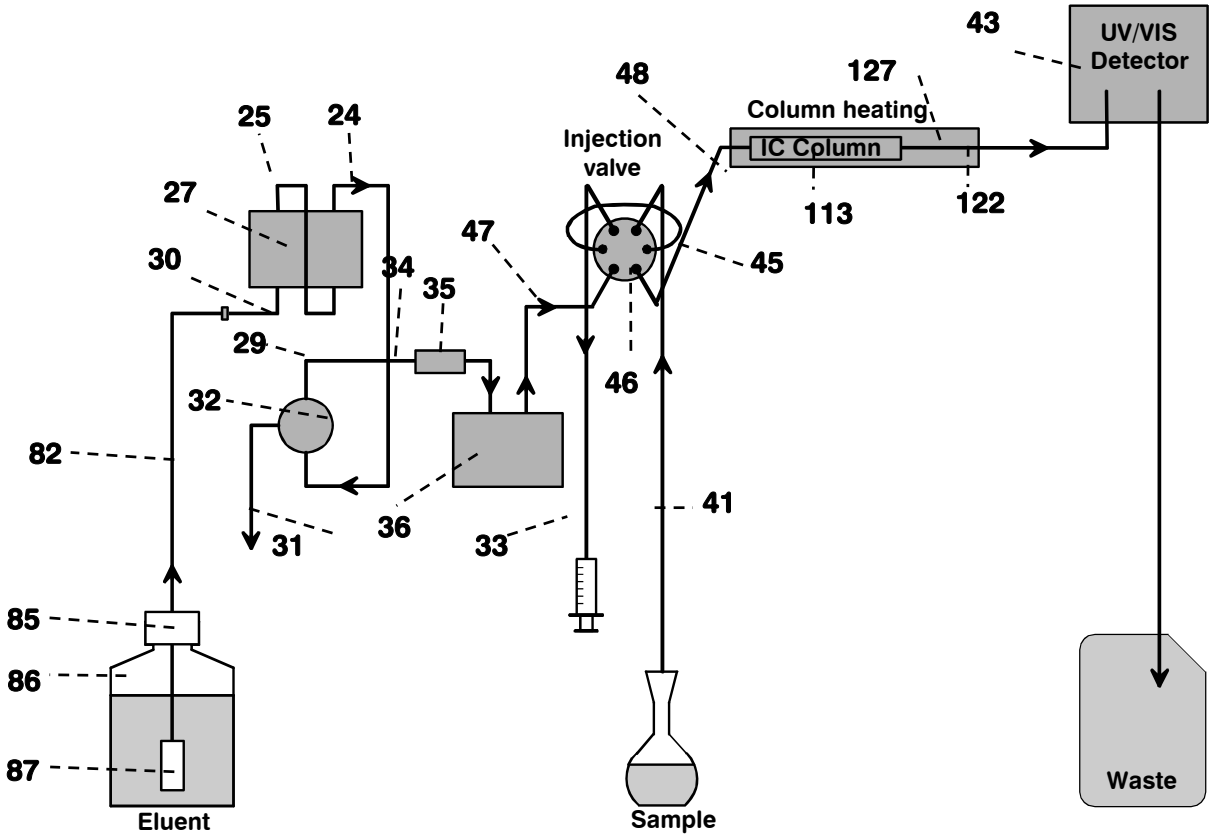


Figure 8: Connecting diagram for 844 UV/VIS Compact IC 2.844.0110 with Column heating

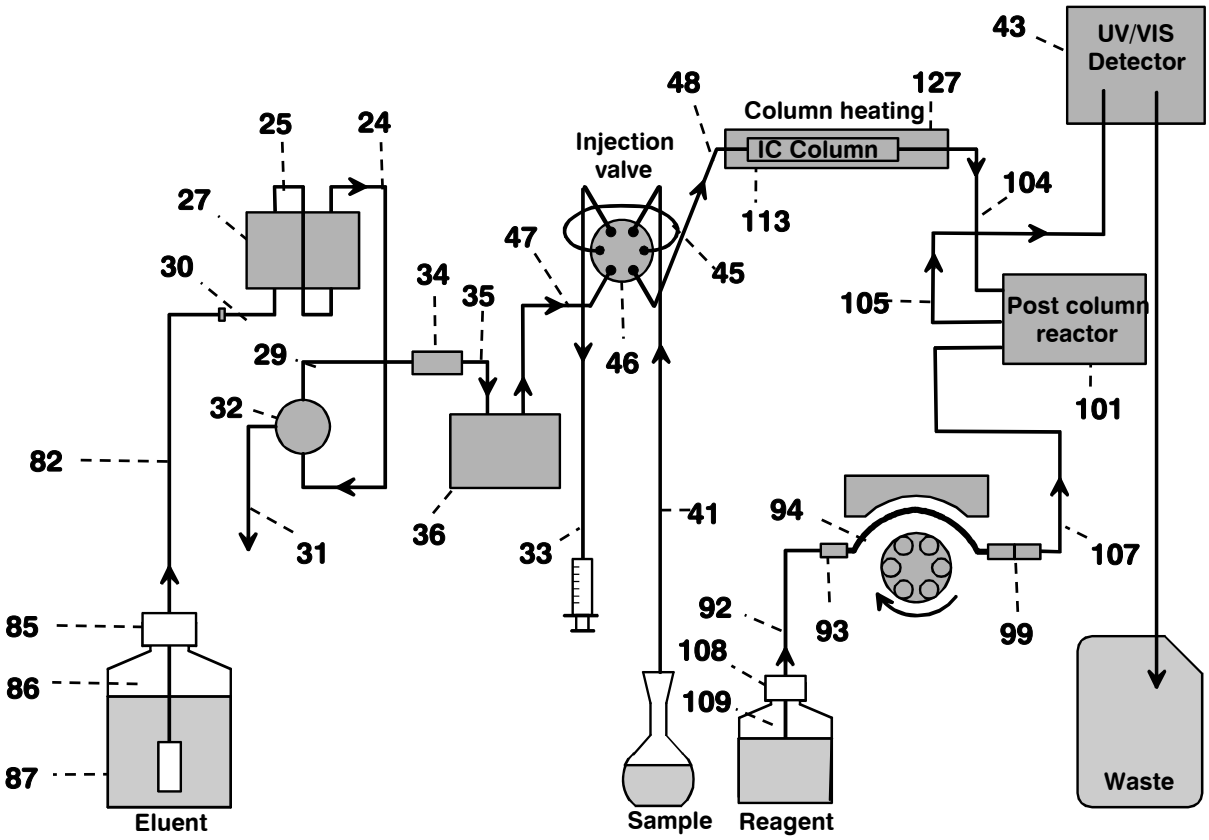


Figure 9: Connecting diagram for 844 UV/VIS Compact IC 2.844.0120 with Post column reactor and Column heating

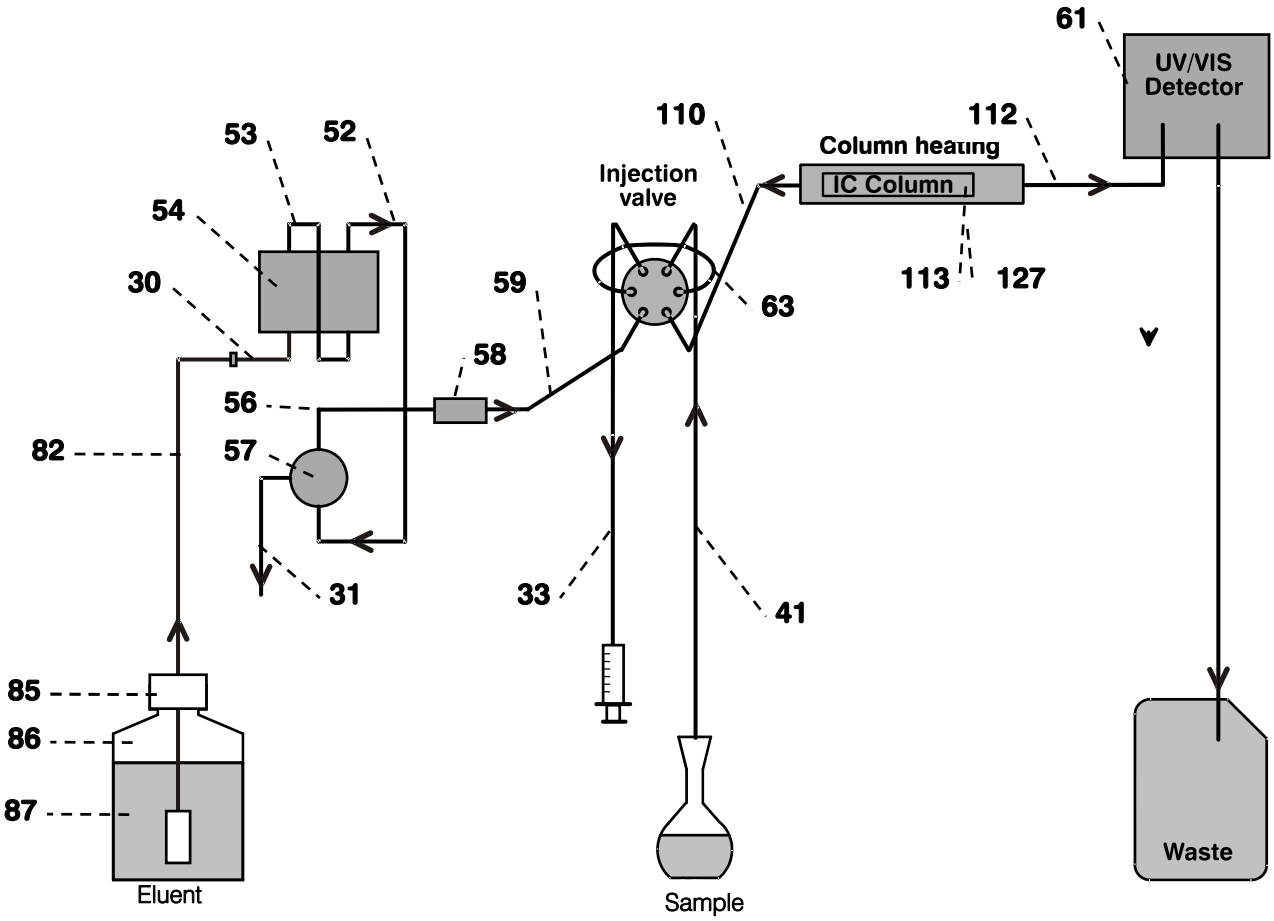


Figure 10: Connecting diagram for 844 UV/VIS Compact IC 2.844.0130 with Column heating

2.2 Setting up the instrument

2.2.1 Packaging

The 844 UV/VIS Compact IC is supplied together with the separately packed accessories in special packagings containing shock-absorbing foam linings designed to provide excellent protection. The instrument itself is packed in an evacuated polyethylene bag to prevent the ingress of dust. Please store all these special packagings as only they assure transport of the instrument free from damage.

2.2.2 Check

After receipt, immediately check whether the shipment is complete and has arrived without damage (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".

2.2.3 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.

To avoid disturbing temperature influences on the insulated column compartment, the instrument must be protected against direct sunlight.

2.3 Attaching the accessories

2.3.1 Connecting the syringe and aspirating tubing

For the manual filling of sample loop **45/63** mounted at the injection valve the 6.2816.020 Syringe and PTFE aspirating tubing **41** (already connected to the injection valve) are required. These accessories are attached and adjusted as follows:

1 Connecting the syringe

- Remove the plastic stopper from connection **7** on the front panel of the 844 UV/VIS Compact IC.
- Push 6.2816.020 Syringe(without needle) into connection **7** until it reaches the stop.

2 Pull out the aspirating tubing

- Pull the PTFE aspirating tubing **41** connected to injection valve **46/61** through feedthrough **7** by hand as far as required.

2.3.2 Connecting the drainage tubing for the inner compartment

The 844 UV/VIS Compact IC has a connection **39** on its front panel to allow any escaped liquid to be drained off from the inner compartment. A piece of drainage tubing can be attached to it. Proceed as follows:

1 Connecting the drainage tubing

- Push 6.1816.060 Silicone tubing onto the connection nipple at the bottom right-hand side of the front panel.

2 Lead the drainage tubing into a drain

- Lead the other end of the drainage tubing into a drain and fix it in position.

2.3.3 Connecting PEEK capillaries

With the versions 2.844.0010, 2.844.0020, 2.844.0110 and 2.844.0120, the connections from the high-pressure pump to the detector consist of 6.1831.010 PEEK capillaries (i.d. = 0.25 mm, o.d. = 1/16"), which are connected with either 6.2744.010 PEEK compression fitting (long) or

6.2744.070 PEEK compression fitting (short). The connection pieces are mounted on the capillaries as follows:

PEEK capillaries that are to be provided with new connection pieces must have a perfectly flat cut surface. This is best achieved by using the 6.2621.080 Capillary cutter available as an option.

1 Mounting the compression fitting

- At the end of capillary Fehler! Verweisquelle konnte nicht gefunden werden. that is to be attached push either a compression fitting Fehler! Verweisquelle konnte nicht gefunden werden. (6.2744.010) or compression fitting Fehler! Verweisquelle konnte nicht gefunden werden. (6.2744.070) over the capillary as shown in Fehler! Verweisquelle konnte nicht gefunden werden..

2 Lead the capillary into the connection

- Push the capillary end into the corresponding connection until it reaches the stop (in order to avoid dead volume).

3 Tighten up compression fitting

- Tighten up compression fitting Fehler! Verweisquelle konnte nicht gefunden werden. or Fehler! Verweisquelle konnte nicht gefunden werden. by hand (do not use any tools).

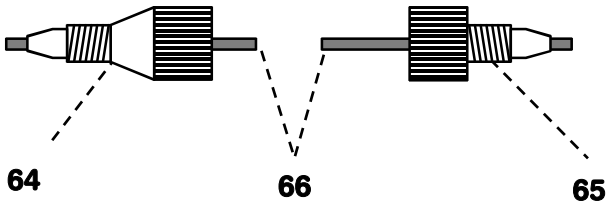


Figure 11: Connectors for PEEK capillaries

64	**Compression fitting (6.2744.010)**
65	**Compression fitting (6.2744.070)**
66	**Capillary 6.1831.XXX PEEK capillary**

2.3.4 Connecting Steel capillaries

With the versions **2.844.0030** and **2.844.0130**, the connections from the high-pressure pump to the detector consist of **6.2620.020 Steel capillaries** (i.d. = 0.25 mm, e.d. = $^1/_{16}$", length = 3 m), which are connected with the steel connectors **6.2620.010 Ferrule** and **6.2620.000 Pressure screw** available as an option. The connection pieces are mounted on the capillaries as follows:

*Steel capillaries fitted with new connectors must have a perfectly flat cut surface. This is best achieved by using the **6.2621.040 Capillary tubing cutter** available as an option.*

1 Mount connectors

Slide a pressure screw **69** (6.2620.000) and a ferrule **68** (6.2620.010) over the end of the capillary **70** to be fastened.

2 Insert capillary in connection

Push capillary end into the corresponding connection as far as it will go (to avoid dead volume).

3 Tighten pressure screw

Tighten pressure screw **69** with the open-end spanner 1/4" (6.2621.010) supplied.

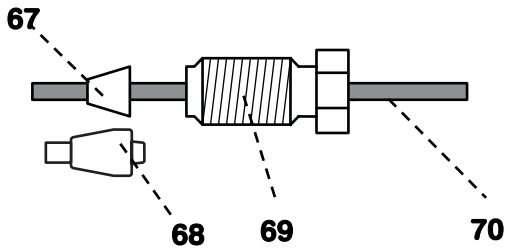


Figure 11: Connectors for Steel capillaries

67	**Ferrule (6.2620.010)** used in pre-installed components only
68	**Ferrule (6.2620.270)**
69	**Pressure screw (6.2620.000)**
70	**Capillary** 6.2620.020 Steel capillary

2.3.5 Filter unit PEEK

With the versions **2.844.0010**, **2.844.0020**, **2.844.0110** and **2.844.0120**, there is a **6.2821.120 PEEK filter unit** mounted between the high-pressure pump and injection valve **46.** It protects the valve against particles.

PEEK filter unit **34** consists of housing **73**, filter screw **71** and filter **72**. New filters **72** are available as an option under ordering number 6.2821.130 (10 pieces).

When connecting the filter unit please note the flow direction arrow printed on the housing.

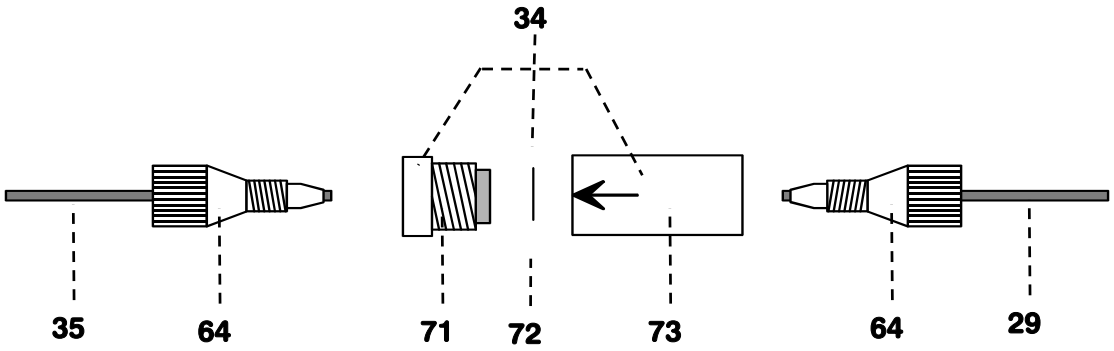


Figure 12: 6.2821.120 Filter unit PEEK

29 Connection capillary
6.1831.010 PEEK capillary, length *L* = 13 cm

34 Filter unit PEEK (6.2821.120)

35 Connection capillary
6.1831.010 PEEK capillary, length *L* = 13 cm

71 Filter screw of filter unit
Part of 6.2821.120 Filter unit

72 Filter 6.2821.130
Part of 6.2821.120 Filter unit

73 Filter housing of filter unit
Part of 6.2821.120 Filter unit

2.3.6 Filter unit Steel

With the versions **2.844.0030** and **2.844.0130**, there is a **Steel filter unit 6.2620.180** mounted between the high-pressure pump and injection valve. It protects the valve against particles.

The Steel filter unit consists of housing **78,** filter screw **76** and filter **77**. New filters **77** are available as an option under ordering number 6.2821.130 (10 pieces).

When connecting the filter unit please note the flow direction arrow printed on the housing.

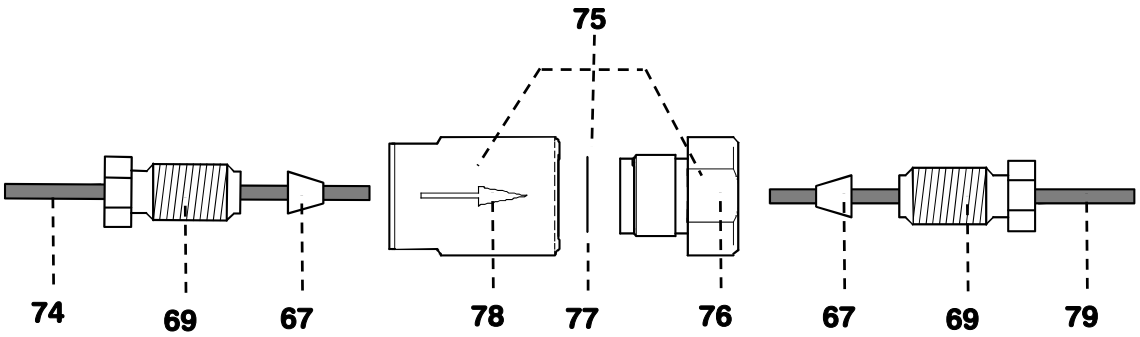


Figure 13: 6.2620.180 Filter unit Steel

74 Steel connection capillary 6.2620.020
from steel purge valve to steel filter unit.

75 Steel filter unit 6.2620.180

76 Filter screw of filter unit
Part of 6.2620.180 Filter unit

77 Filter 6.2620.190
Part of 6.2620.180 Filter unit

78 Filter housing of filter unit
Part of 6.2620.180 Filter unit

79 Steel connection capillary 6.2620.020
from steel filter unit to steel pulsation dampener

2.4 Mains connection

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

2.4.1 Setting the mains voltage

Before switching on the 844 UV/VIS Compact IC for the first time, check that the mains voltage set on the instrument matches the local mains voltage. If this is not the case, you must reset the mains voltage on the instrument as follows:

1 Disconnect mains cable
Disconnect mains cable from mains connection plug **21** of the 844 UV/VIS Compact IC.

2 Disconnect mains cable
Using a screwdriver, loosen fuse holder **22** below the mains connection plug **21** and take out completely.

3 Check and change fuse if necessary
Carefully take the fuse installed for the desired mains voltage out of fuse holder **22** and check its specifications (the position of the fuse in the fuse holder is marked by the white arrow imprinted next to the mains voltage range):

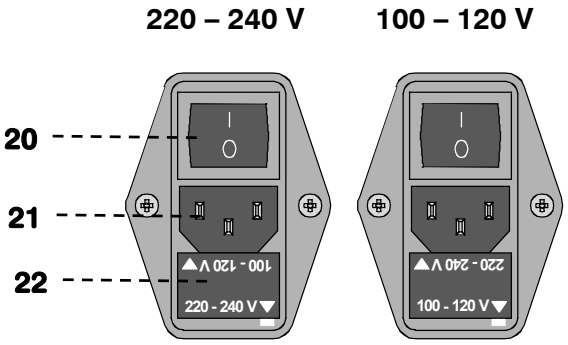
100…120 V 1.6 A (slow-blow)

220…240 V 0.8 A (slow-blow)

4 Insert fuse
Change fuse if necessary and reinsert in fuse holder **22**.

5 Install fuse holder
Depending on the desired mains voltage, insert fuse holder **22** in the 844 UV/VIS Compact IC so that the corresponding mains

voltage range can be read normally and the adjacent white arrow points to the white bar imprinted below the fuse holder.



20 Mains switch
to switch instrument on and off:
I = ON 0 = OFF

21 Mains connection plug
Mains connection, see *Section 2.4.3*

22 Fuse holder

Figure 14: Setting the mains voltage

2.4.2 Fuses

One of the two fuses 1.6 A/slow-blow for 100…120 V or 0.8 A/slow-blow for 220…240 V is installed in fuse holder **22** of the 844 UV/VIS Compact IC as standard.

Ensure that the instrument is never put into operation with fuses of another type, otherwise there is danger of fire!

When checking or changing fuses proceed as described in *Section 2.4.1*.

2.4.3 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 a grounding pin. If a different plug has to be fitted, the yellow/green lead (IEC standard) must be connected to protective ground (protection class 1).

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

Mains connection

Plug the mains cable into mains connection plug **21** of the 844 UV/VIS Compact IC.

2.4.4 On/off switching of the instrument

The 844 UV/VIS Compact IC is switched on and off using mains switch **20**. When the instrument is switched on, the mains pilot lamp **3** lights up.

2.5 Connection to PC

2.5.1 Connecting cable

Always switch off 844 UV/VIS Compact IC and PC before you connect the two instruments with the 6.2134.100 Cable.

Connect the RS232 interface **18** at the 844 UV/VIS Compact IC to a serial COM port at the PC using the 6.2134.100 Cable (9-pin/9-pin). If only a 25-pin COM interface is available on the PC then the 6.2125.110 Adapter cable or a commercially available adapter must be used.

2.5.2 Software installation

The PC program **«IC Net»** (from Version 2.3 SR2) is required for operating the 844 UV/VIS Compact IC; this is included in the standard equipment on CD 6.6034.033. This program runs under the operating systems Windows 2000 and Windows XP and is installed as follows:

1 Install program

- Insert the installation CD 6.6034.033 into your CD-ROM drive.
- If the autorun option for the CD drive is disabled, select **<Start>** and **Run**. Browse for the **Setup.exe** file on the installation CD and click on **<OK>**.
- Click "**IC Net**" and follow the on-screen prompts of the Setup program (see *Instructions for Use «IC Net», Section 1.5* for a more detailed description).

2 Files

- The installation program copies the files from the installation CD into the folder entered by you and generates the subfolders **IC Net** and **Autodatabase**. The following subfolders are also generated, among others:

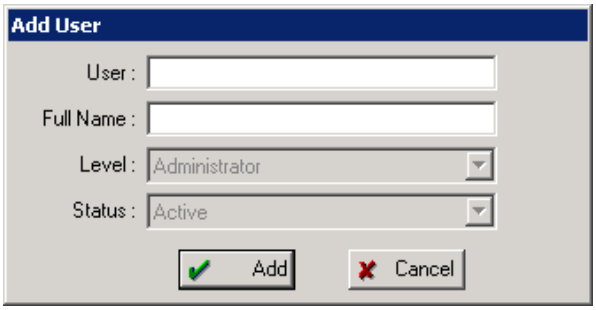
Data	Folder for storage of chromatogram files (***.chw**) and batch reprocessing files (***.bar**)
Devices	Folder for storage of device files (***.dev**)
Excelreport	Folder for Excel reports (***.xls**)
Methods	Folder for storage of method files (***.mtw**)
Reports	Folder for storage of report files (***.txt**) and graphic files (***.wmf**)
Systems	Folder with subfolders with system files (***.smt**) and sample queue files (***.que**).

The installed files (incl. system and method files) are generally not write-protected. To prevent these files from being deleted by mistake, switch on the write-protection or make a backup copy in another directory.

2.5.3 First Login

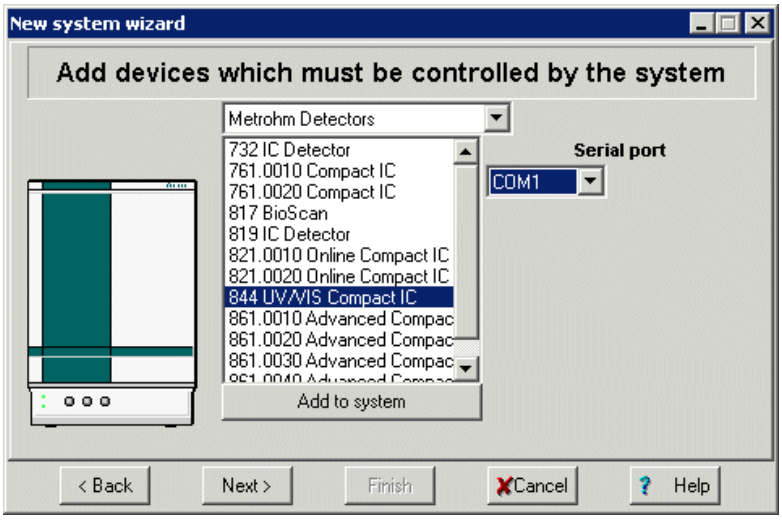
Starting and closing of the Software is described in the provided *Software Instructions for Use «IC Net», Section 2*.

*The **Add User** window (see below) opens the first time you launch the program after installing the software and a user with Administrator access rights is created.*



2.5.4 Create a system

Create in **«IC Net»** a system to control the 844 UV/VIS Compact IC. Proceed as described in *Section 4.4.1* of the *Software Instructions for Use «IC Net»: System wizard.* Add your version of the 844 UV/VIS Compact IC (they are listed under "Metrohm Detectors") to the system, and choose the port to which it is connected.



2.6 High-pressure pump

In order to avoid damage to the pump it must never be operated dry. Each time that the pump is switched on always first check that the eluent supply has been connected up correctly and that sufficient eluent is present in the eluent bottle.

2.6.1 Removing the transport security screws

In order to prevent the pump drive from being damaged during transport the pump head is fitted with three transport security screws **19**. These transport security screws must be removed before the high-pressure pump is started up. Also remove the red sticker attached to the pump head **27**/**54**.

In order to avoid damage to the pump head these three security screws should be attached to the pump head each time that the 844 UV/VIS Compact IC is to be transported.

2.6.2 Installing the pulsation dampener

With the PEEK versions **2.844.0010**, **2.844.0020**, **2.844.0110** and **2.844.0120**, the **6.2620.150 Pulsation dampener MF** has to be installed between the high-pressure pump and the injection valve of the 844 UV/VIS Compact IC, to protect the column material against pressure drops caused by the injection valve. Proceed as follows:

1 Install pulsation dampener

- Position the pulsation dampener **36** in the interior of the Compact IC on the base.

2 Connection to the pump

- Unscrew PEEK capillary **35** of coupling and attach it to connection **80** of the pulsation dampener **36**.

3 Connection to injection valve

- Unscrew PEEK capillary **38** of coupling and attach it to connection **81** of the pulsation dampener **36**.

The pulsation dampener is filled with isopropanol and must be rinsed with eluent before connection to a separating column (see Section 2.6.4).

The 6.2620.150 Pulsation dampener can be operated in both directions.

The two steel versions 2.844.0030 and 2.844.0130 are operated without Pulsation dampener.

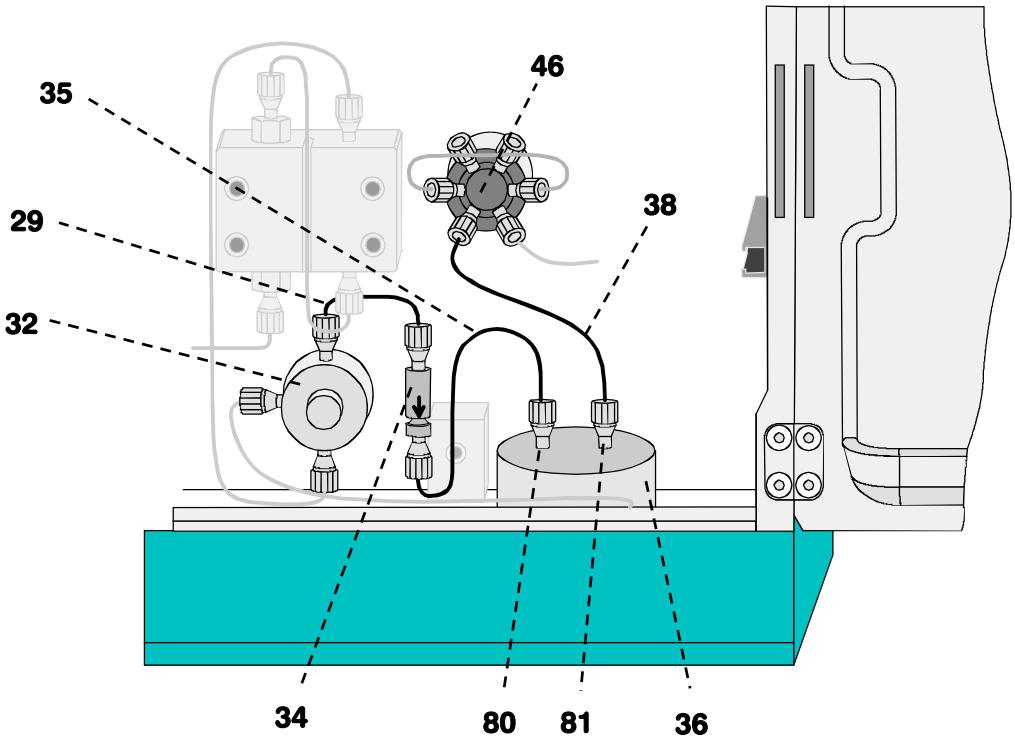


Figure 15: Connection of the pulsation dampener

29 Connection capillary
6.1831.010 PEEK capillary,
length *L* = 13 cm

32 Purge valve

34 Filter unit PEEK (6.2821.120)

35 Connection capillary
from Filter unit PEEK to Pulsation dampener.
6.1831.010 PEEK capillary,
length *L* = 13 cm

36 Pulsation dampener (6.2620.150)

38 Inlet capillary for injection valve
PEEK capillary 6.1831.010,
length *L* = 24 cm

46 Injection valve

80 Connection to purge valve

81 Connection to injection valve

2.6.3 Connecting the eluent bottle

The eluent supply line from the storage bottle to the high-pressure pump is connected as follows:

*Only **degassed** (with N_2, He or vacuum) and **microfiltered** (0.45 µm filter) **eluents** should be used!*

*The 6.1608.070 Eluent bottle (2 L) supplied is **not suitable for vacuum degassing**. Use a pressure-resistant container for this.*

*Care must be taken that the **eluent** used is **freely miscible** with any solvent remaining in the pump head (the pump head leaves the factory filled with either isopropanol or methanol/water). If this is not the case then the pump must first be rinsed with a solvent which is miscible with both the previous eluent and the following eluent (e.g. acetone).*

1 Prepare eluent bottle

- Prepare, microfilter (0.45 µm microfilter) and degas (with N_2, He, or vacuum) the suitable eluent for the required application and separating column.
- Fill eluent into eluent vessel **86**(clear glass, 2 L).

2 Install bottle attachment

- Firmly screw threaded stopper **84** (6.1446.040; part of 6.1602.160) into the smaller threaded opening (M6) of bottle attachment **85** (6.1602.105; part of 6.1602.160).
- Firmly screw aspirating filter **87** onto aspirating tubing **82**.
- Pull the other end of aspirating tubing **82**. through the larger threaded opening (M8) of bottle attachment **85** from below.
- Push O-ring (E.301.0021; part of 6.1602.160) over the free end of aspirating tubing **82**. and move it towards bottle attachment **85**.
- Push tubing nipple **83** (4.420.4300; part of 6.1602.160) over the free end of aspirating tubing **82**., move it as far as required towards bottle attachment **85** and screw it loosely in the larger opening of bottle attachment **85**.
- Insert aspirating tubing **82**. with screwed-on aspirating filter **87** into eluent bottle **86** and screw bottle attachment **85** onto eluent bottle **86**.
- Pull aspirating tubing **82**. so far through the opening of tubing nipple **83** that aspirating filter **87** is touching the bottom of eluent bottle **86**.
- Fix aspirating tubing **82**. in place by screwing shut tubing nipple **83**.

3 Mount CO_2 absorber tube

- First place a piece of cotton wool **89** followed by CO_2 absorber **88** (e.g. Merck soda lime pellets with indicator, no. 6839.1000) in the large opening of absorber tube **91** and then close it with the plastic lid.
- Fasten absorber tube **91** to bottle attachment **85** with the aid of SGJ clip **90**.

4 Connect aspirating tubing to pump

- Lead the free end of aspirating tubing **82**. through opening **2** into the inner compartment of the 844 UV/VIS Compact IC.
- Pull aspirating tubing **82** sufficiently far into the interior of the 844 UV/VIS Compact IC, cut off to the required length and push at least 5 mm of it onto aspirating capillary **30** of the high-pressure pump (it may be necessary to use emery paper).
- If necessary, fix aspirating tubing **82** in the required position in the interior with the aid of the Y.107.0150 self-adhesive strap.

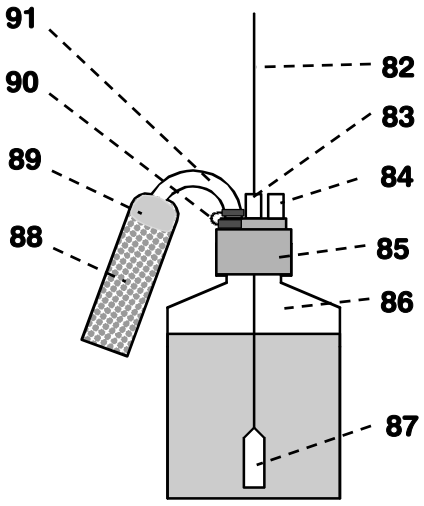


Figure 16: Connection of eluent bottle

82	**Aspirating tubing (6.1834.010)**
83	**Tubing nipple (4.420.4300; M8)** with E.301.0021 O-ring
84	**Threaded stopper (6.1446.040; M6)**
85	**Bottle attachment (6.1602.105)**
86	**Eluent bottle (6.1608.070)**
87	**Aspirating filter (6.2821.090)**
88	**CO2 absorber**
89	**Cotton wool**
90	**SGJ clip (6.2023.020)**
91	**Absorber tube (6.1609.000)**

2.6.4 Deaerating the pump and rinsing the pulsation dampener

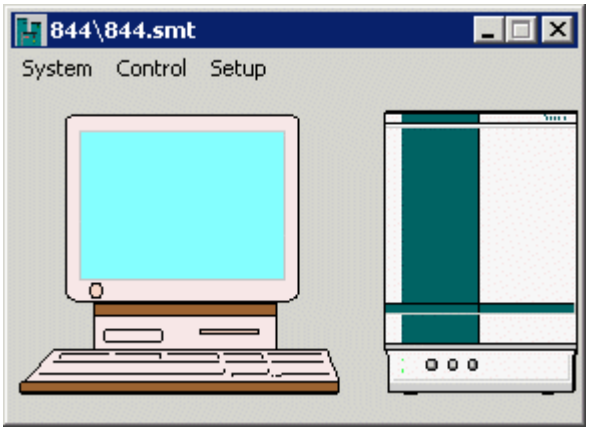
The first time that it is started up the high-pressure pump must be de-aerated. Proceed as follows:

1 Prepare for deaeration

- Open the rotary knob on purge valve **32** by approx. ½ turn in the counterclockwise direction.
- Remove the plastic stopper from connection **6** on the front panel of 844 UV/VIS Compact IC.
- Push 6.2816.020 Syringe (without needle) into connection **6** until the stop is reached.

2 Open and connect system

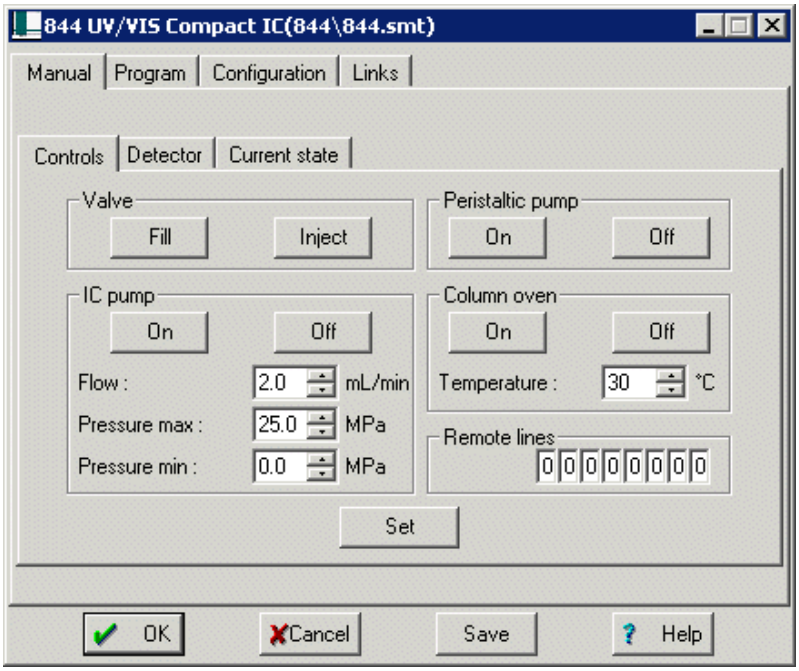
- Start the **«IC Net»** PC program, if it has not already been started (see Section 2.5.3).
- Select **File** / **Open** / **System** in the main window. Select the system created in Section *2.5.4*, and click on **<Open>**.



- Select the **Connect to workplace** item of the **Control** menu in this window.

3 Set flow rate to 2 mL/min

- Double-click the 844 icon in the system window to open the window for manual control of the 844 UV/VIS Compact IC (see below).
- Set the flow rate to **2 mL/min** in the **Flow** field.
- Click to **<Set>** to send this value to the 844 UV/VIS Compact IC.



4 Deaerate pump

- Make sure that the aspirating tubing **82** for the high-pressure pump has been immersed into the eluent.
- Click the **<On>** button for **IC pump** to switch on the high-pressure pump.
- Use the syringe inserted into connection **6** to aspirate air until eluent flows bubble-free into the syringe.
- Click the **<Off>** button for **IC pump** to switch off the high-pressure pump.
- Close the rotary knob on purge valve **32** by turning it in a clockwise direction.
- Remove the syringe from connection **6**.

5 Rinse pulsation dampener

- Place a beaker beneath the column connection capillary **47**.
- Click the **<On>** button for IC pump to switch on the high-pressure pump and rinse the pulsation dampener **36** filled with isopropanol for approx. 10 min with eluent.
- Click the **<Off>** button for **IC pump** to switch off the high-pressure pump.

6 Reduce flow rate

- Reset the original flow rate under **Flow** (e.g. **0.5 mL/min**).
- Click **<Set>** to send this value to the 844 UV/VIS Compact IC.
- Click **<Save>** to save the values.

2.7 Post column reactor

*This chapter covers the two versions **2.844.0020** and **2.844.0120**.*

With versions 2.844.0010, 2.844.0030, 2.844.0110 or 2.844.0130 you can skip this chapter and go directly to Section 2.8.

Instrument versions **2.844.0020** and **2.844.0120** of the 844 UV/VIS Compact IC contain the 6.2836.000 Post column reactor (see *Instructions for Use 8.108.1031 Post column reactor*).

2.7.1 Preparing the peristaltic pump

Before it is started up, the accessories must be mounted on the peristaltic pump built into the 844 UV/VIS Compact IC Proceed as follows:

1 Remove the tubing cartridge

- Loosen tubing cartridge **96** mounted above pump drive **51** by pressing down snap-action lever **98** from holder clip **50** and remove it from mounting pin **40**.

2 Attach coupling 93

- At the left-hand end of pump tubing **94** 6.1826.320 push on a coupling **93** 6.2744.030. Slightly moistening the Tipp of the coupling makes this easier.
- Fix "Aspirating tubing for reagent" **92** to coupling **93** using compression fitting **64** (6.2744.010).

3 Attach "Coupling with filter and tubing security device" 99

- To the right-hand end of pump tubing 94 6.1826.320 attach a "coupling with filter and tubing security device" 99 6.2744.180:
- Dismantle the tubing security device and first push the union nut and compression piece onto the tubing.
- Push the tubing onto the coupling and screw the union nut onto the coupling to secure the tubing.

4 Insert the pump tubing

- Insert the fitted-out pump tubing 94 into the tubing cartridge. The middle stopper **95** should click into position in the corresponding holder on left-hand side of the tubing cartridge.

5 Reinsert the tubing cartridge

- Insert the tubing cartridge with pump tubing 94 into the front of the holding clip. Insert the left-hand side first, then press down the right-hand side until snap-action lever **98** clicks into position. Make sure that the pump tubing has no kinks.

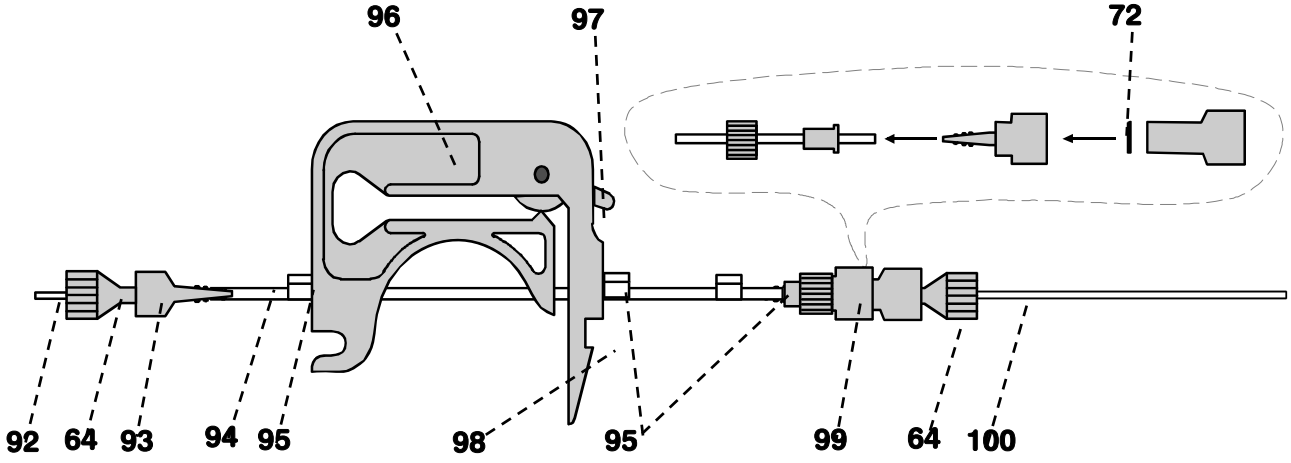


Figure 17: Installing pump tubings

64 Compression fitting (6.2744.010)

72 Filter 6.2821.130

92 Aspirating tubing for reagent
6.1803.020 PTFE tubing

93 Coupling (6.2744.030)

94 **Pump tubing 6.1826.320**
for reagent

95 **Stopper (orange-yellow)**

96 **Tubing cartridge (6.2755.000)**

97 **Contact pressure lever**
for adjusting the contact pressure

98 **Snap-action lever**
for releasing the tubing cartridge

99 **PEEK coupling with filter and tubing security device 6.2744.180**

100 **Connection capillary**
PTFE Capillary 6.1803.150,
length L = 20 cm

2.7.2 Installation of the post column reactor

The installation procedure is as follows:

1 **Attach PCR holder 102**

- Push the PCR holder with the strip on its rear panel onto lower mounting rail **44**.

2 **Insert post column reactor 101 in PCR holder 102**

- Insert post column reactor **101** into PCR holder **102** with its tubing connections facing upward.
- Push PCR holder **102** with post column reactor **101** as far downward as possible.

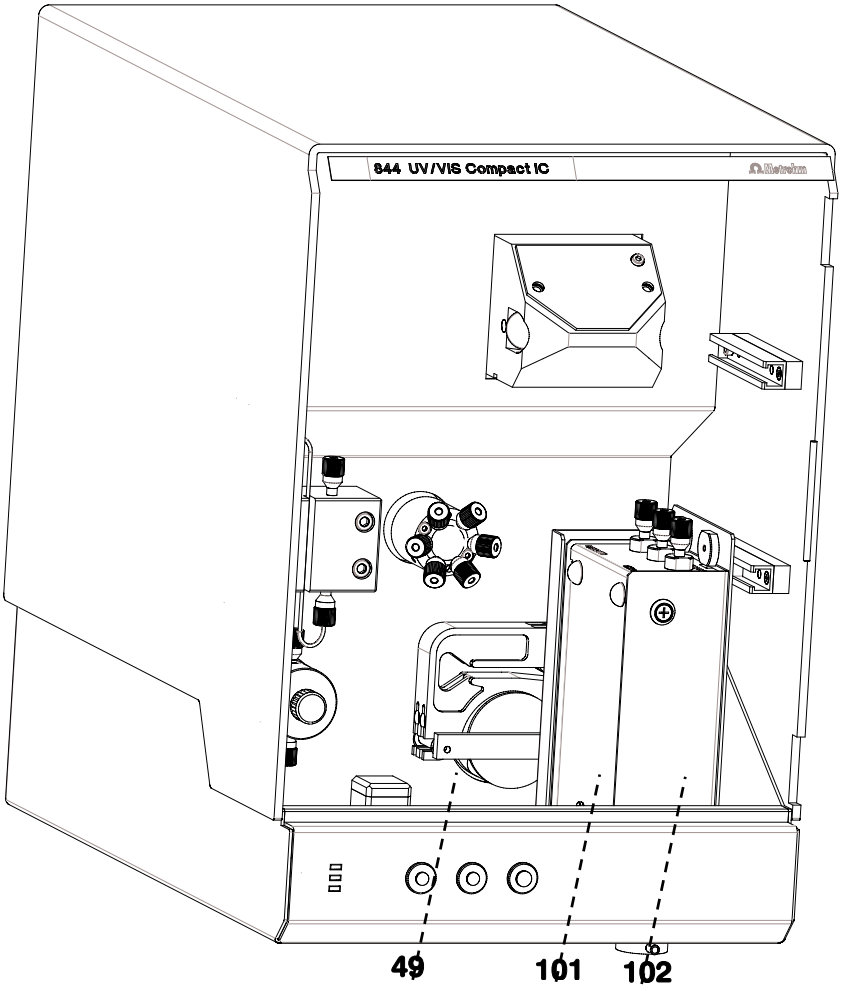


Figure 18: Attaching the post column reactor

49 **Peristaltic pump**
for operating the post column reactor

101 **6.2836.000 Post column reactor**

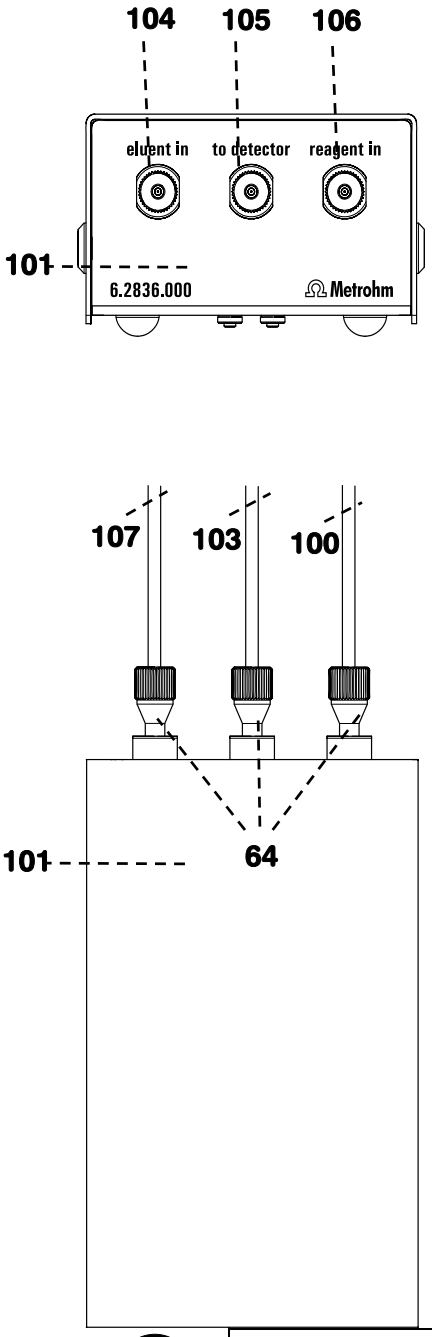
102 **6.2057.050 PCR holder**
Holder for post column reactor

2.7.3 Post column reactor tubing connections

The connections for the column (*Section 2.8*) and detector (Section 2.9) are described later. In this first step the reagent flow is connected:

1 Connect pumping tube to inlet "reagent in" 106

- Attach connection capillary **100** 6.1803.050 (20 cm) to post column reactor inlet "reagent in" **106** using a compression fitting **64** (6.2744.010).



100 **Connection capillary**
PTFE Capillary 6.1803.050,
length *L* = 20 cm

101 **Post column reactor 6.2836.000**

103 **Connection capillary**
PEEK Capillary 6.1831.110,
length *L* = 30 cm

104 **Post column reactor "eluent in"**
Inlet from column

105 **Post column reactor "to detector"**
Outlet to detector

106 **Post column reactor "reagent in"**
Inlet for post column reagent from peristaltic pump

107 **Connection capillary**
PEEK Capillary 6.1831.110,
length *L* = 30 cm

If a column heating is used, the capillary **124** is connected here.

Figure 19: Post column reactor

The post column reactor connections to the column and detector are described in Section 2.8 *and Section 2.9.*

2.7.4 Reagent bottle connection

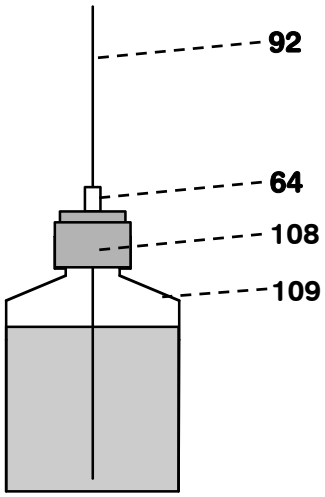
The reagent solution tubing from the supply bottle to the peristaltic pump is mounted as follows:

1 **Preparing the supply bottle for the reagent**

- Fill the reagent solution into supply bottle **109** (amber glass, 1 L) and label the bottle.
- Screw bottle attachment **108** onto supply bottle **109**.

2 **Connect aspirating tubing for reagent**

- Prepare aspirating tubing **92**: cut a piece of 6.1803.020 PTFE tubing to the required length (normally approx. 120 cm).
- Pull one end of the aspirating tubing **92** through a PEEK compression fitting **64** (6.2744.010) so that approx. 30 cm of the tubing projects.
- Screw PEEK compression fitting **64** with the tubing into one opening of bottle attachment **108** mounted on the supply bottle for the regeneration solution and tighten it up so that the tubing is firmly held.
- Lead the free end of aspirating tubing **92** from above into one of the openings **2** of the 844 UV/VIS Compact IC and pull it sufficiently far into the inner compartment.
- Connect aspirating tubing **92** to the inlet end of pump tubing **94** using a compression fitting **64** and a coupling **93**.



64	**Compression fitting (6.2744.010)**
92	**Aspirating tubing for reagent** 6.1803.020 PTFE tubing
108	**Bottle attachment (6.1602.150)**
109	**Supply bottle 6.1608.020**

Figure 20: Connection of reagent

2.8 Columns

2.8.1 Precolumns

The use of easily exchangeable precolumns protects the separating columns and prolongs their lifetime. The precolumns available from Metrohm are either real precolumns or precolumn cartridges, which are used together with a cartridge holder. For the installation of a precolumn cartridge into the accompanying cartridge holder see the attached leaflet.

*The precolumn that is suitable for your separating column can be found in the **Metrohm IC Column Catalog** which can be obtained from your local Metrohm agency, the data sheet accompanying your separating column, the product information about separating columns that can be found under http://www.metrohm.com, ion chromatography products, or let your agency advise you directly.*

New IC precolumns are normally filled with solution and sealed at both ends. Before the precolumn is installed in the system, it must be ensured that this solution is freely miscible with the eluent used (check manufacturer's specifications).

1 Connect precolumn

- The precolumn is mounted upstream from the separating column. Use as short a piece of 6.1831.010 PEEK capillary as possible.
- If column heating is used (see *Section* 2.8.4 the precolumn can also be placed in the inner compartment of the column heating. Use an S-Guard for this. Other precolumns can only be mounted outside the column heating.

When you install the column, always ensure that this is inserted correctly in accordance with the flow direction (if existent) shown.

2 Rinse the precolumn

- Place a beaker beneath outlet capillary.
- Switch on IC Pump in «IC Net» and rinse precolumn for approx. 10 min with eluent.
- Switch off IC Pump.

2.8.2 General information on separating columns

*The precolumn that is suitable for your separating column can be found in the **Metrohm IC Column Catalog**, the product information about separating columns that can be found under http://www.metrohm.com, ion chromatography products, or let your agency advise you directly.*

New IC separating columns are normally filled with solution and sealed at both ends. Before the column is installed in the system, it must be ensured that this solution is freely miscible with the eluent used (check manufacturer's specifications).

The separating columns currently available from Metrohm and precolumns can be found in the **Metrohm IC Column Catalog**, or on the Internet under http://www.metrohm.com in the ion chromatography product section. Each column is supplied with a test chromatogram and a data sheet. More detailed information about special IC applications can be found in the relevant **"Application Bulletins"** or **"Application Notes"**; these are available on the Internet under http://www.metrohm.com in the applications sector, or can be requested free of charge from your local Metrohm agency.

When you install the column always ensure that this is inserted correctly in accordance with the flow direction shown.

2.8.3 Connecting the separating column (installation without column heating)

*This chapter covers the two versions **2.844.0010**, **2.844.0020**, and **2.844.0030**.*

With versions 2.844.0110, 2.844.0120, 2.844.0130 you can skip this chapter and go directly to Section 2.8.4.

With versions **2.844.0010**, **2.844.0020**, und **2.844.0030** without column heating the IC separating column is mounted as follows:

1 Connect column to injection valve

- Remove the sealing caps from column **113**.
- *Without precolumn:*
  Screw the inlet end of column **113** (note flow direction) onto column inlet capillary **47**/**110** at the injector using a compression fitting **64** (6.2744.010).
- *With precolumn:*
  See accompanying data sheet.

2 Rinse column

- Place a beaker under the column outlet.
- Open the software window for manual operation.
- If necessary, set the Flow rate to a suitable value for the selected column and send it to the 844 UV/VIS Compact IC with <Set>.
- Switch on the high-pressure pump (IC pump) by clicking on <On> and rinse the column with eluent for approx. 10 min.
- Switch off the high-pressure pump by clicking on <Off>.

3 Connect the column outlet

- *with 2.844.0010 without post column reactor:*
  - Connect connection capillary **111** to inlet "IN" **131** of flow-through cell **42**.
- *with 2.844.0020 with post column reactor:*
  - Connect connection capillary **107** to the outlet of column **113** using a compression fitting **64** (6.2744.010).
  - Connect connection capillary **107** to the inlet "eluent in" **100** of the post column reactor using a compression fitting **64** (6.2744.010).
- *with 2.844.0030 without post column reactor:*
  - Connect steel connection capillary 2.2620.160 **112** to inlet “IN” **131** of steel flow-trhough cell **62**.

4 Fastening the column

- Insert one or two column holders **114** (6.2027.030, 6.2027.040 or 6.2027.050) in mounting rail **44** and attach column **113** to the column holder.

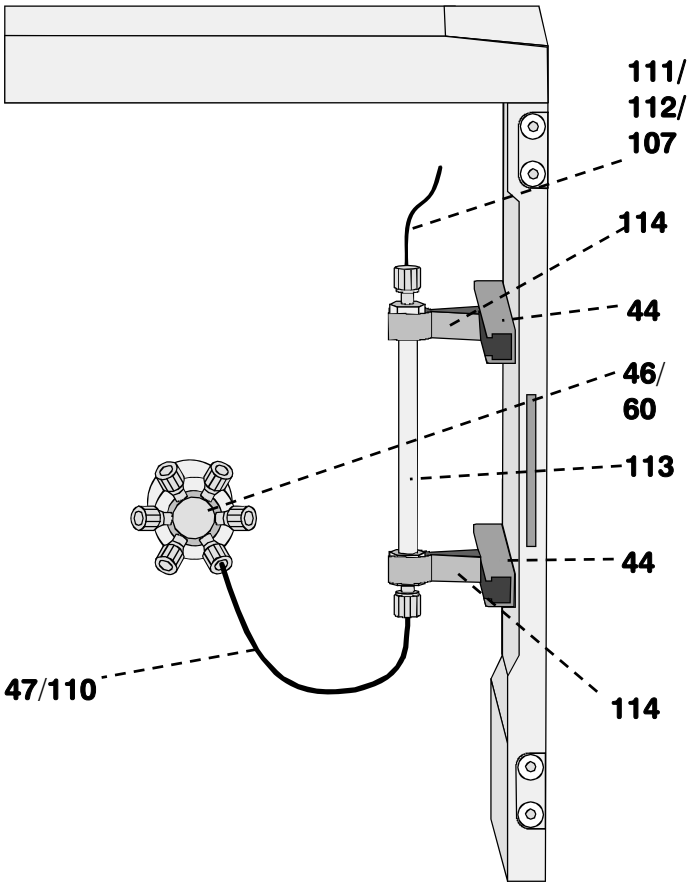


Figure 21: Column connection without column heating

44 Mounting rail
for column holder **104**

46 Injection valve

60 Injection valve steel

47 PEEK column inlet capillary
Connecting injection valve **46** – column **113**

110 Steel column inlet capillary
6.2620.160 from steel injection valve to column

111 Connection capillary
PEEK capillary 6.1831.110, for connection to detector
length L = 30 cm

107 Connection capillary
PEEK capillary 6.1831.110, for connection to post column reactor
length L = 30 cm

112 Steel connection capillary 6.2620.160
for connection to detector.

113 Separating column

114 Column holder 6.2027.0X0

2.8.4 Connecting the separating column (installation with column heating)

2.8.4.1 Column heating

Instrument versions **2.844.0110**, **2.844.0120** and **2.844.0130** of the 844 UV/VIS Compact IC contain a column heating for thermostatting the separating columns.

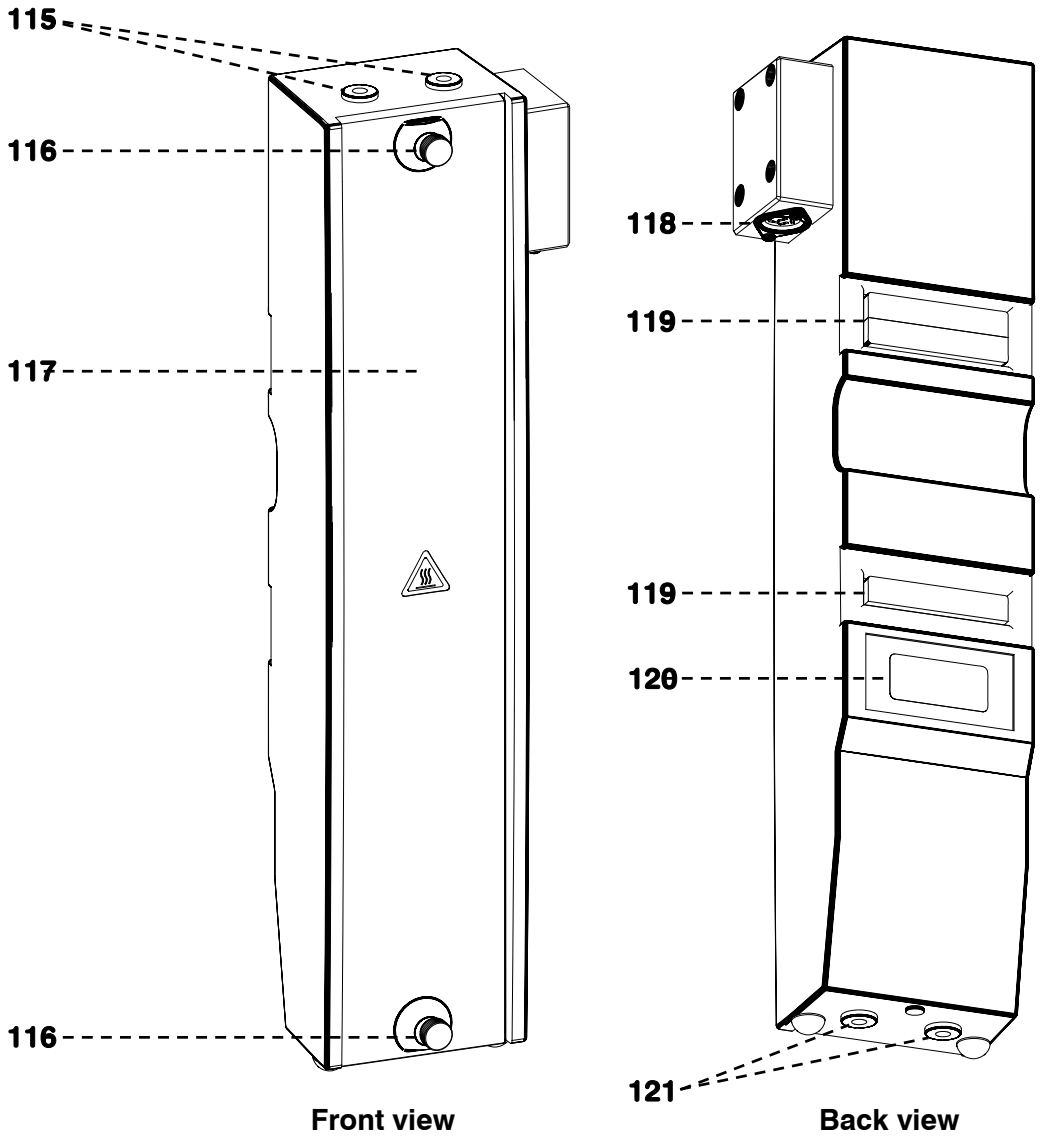


Figure 22: Column heating (closed)

115 Feedthrough
for the capillary from the separating column to detector

116 Knurled screw
for fastening the heater cover **117**

117 Cover of column heating

118 Connection to 844
with cable 6.2108.140

119 Magnetic holder
for fastening the column heater in the inner compartment of the 844 UV/VIS Compact IC

120 Model plate with serial number

121 Feedthrough
for the column inlet capillary **47**/**110**

2.8.4.2 Installing a column in the column heating

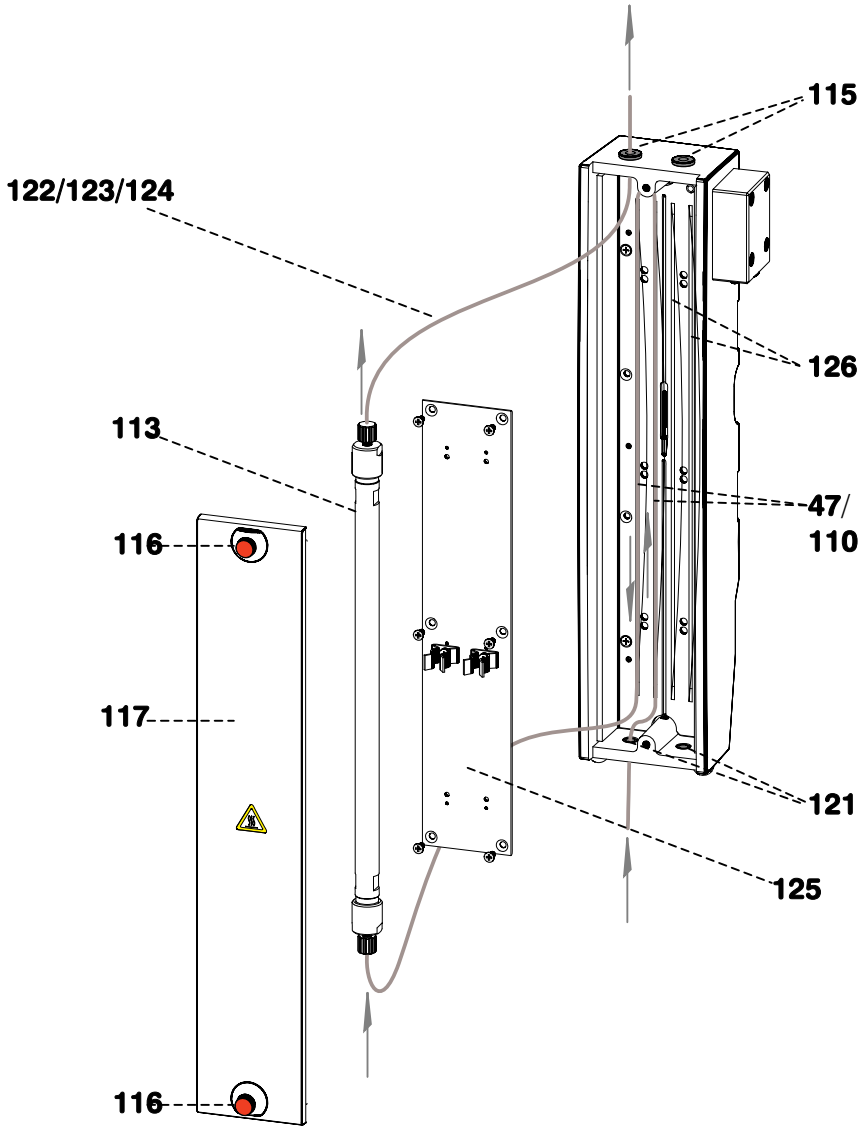


Figure 23: Diagram showing separating column in column heating

47 Column inlet capillary
6.1831.100 PEEK capillary, length L = 100 cm

110 Steel column inlet capillary
6.2620.160 from steel injection valve to column

113 Separating column

115 Feedthrough
for the capillary from the separating column to detector

116 Knurled screw
for fastening the heater cover **117**

117 Cover of column heating

121 Feedthrough
for column inlet capillary **47**/**110**

122 Connection capillary
PEEK Capillary 6.1831.120, for the connection to the detector
length *L* = 45 cm

123 Connection capillary
PEEK Capillary 6.1831.120, for the connection to the post column reactor
length *L* = 45 cm

124 Connection capillary
Steel capillary 6.2620.160, for connection to the detector

Lentth: L=30=cm

125 Holder plate
for separating column

126 Capillary prewarming
for column connection capillary **47**/**110**

1 Open the column heating

- Unscrew the two knurled screws **116** and remove cover **117** from the column heating.

2 Prepare column heating

- Lead column inlet capillary **47**/**110** through feedthrough **121** into the column heating.
- Push column inlet capillary **47**/**110** into the outer one of the two capillary prewarming slots **126** of the channel you have selected. Push column inlet capillary **47**/**110** under holder plate **125** until it appears at the other end.
- Now bend column inlet capillary **47**/**110** and push it through the inner capillary prewarming slot **126** alongside until it appears at the other end.
- Lead connection capillary **123**/**124** (without post column reactor) or **123** (with post column reactor) outward through feedthrough **111** using a compression fitting **64** (6.2744.010) and provide it with a compression fitting **64** 6.2744.010 on the inside.

*If not much space is available then the **6.2744.070 PEEK compression fitting short** contained in the standard equipment can also be used for attaching the PEEK capillary.*

3 Insert separating column

- Push column **113** into the holding clips and fasten column inlet capillary **47**/**110** to the inlet of the column (bottom) using a compression fitting **64** 6.2744.010.
- *with 2.844.0110 without post column reactor:*
  - Attach capillary **122** (to the detector) to the outlet of the column (top) with a compression fitting **64** 6.2744.010.
  - This will be attached to the detector later (see *Section 2.9*)
- *with 2.844.0120 with post column reactor:*
  - Attach capillary **123** (to the post column reactor) to the outlet of the column (top) with a compression fitting **64** 6.2744.010.
  - This will be attached to inlet "eluent in" **104** of the post column reactor later (see below, step 6).

4 Close column heating

- Refasten cover **117** onto the column heating using the two knurled screws **116**.

5 Rinse column

- Place a beaker under the eluent flow outlet.
- Open the software window for manual operation.
- If necessary, set the Flow rate to a suitable value for the selected column and send it to the 844 UV/VIS Compact IC with <Set>.
- Switch on the high-pressure pump (IC pump) by clicking on <On> and rinse the column with eluent for approx. 10 min.
- Switch off the high-pressure pump by clicking on <Off>.

6 Connect column to post column reactor

*Only with Version **2.844.0120** (with Version 2.844.0110 please go directly to Section 2.8.4.3):*

- Attach capillary **123** to inlet "eluent in" **104** of the post column reactor with a compression fitting **64** 6.2744.010.

2.8.4.3 Installing the column heating

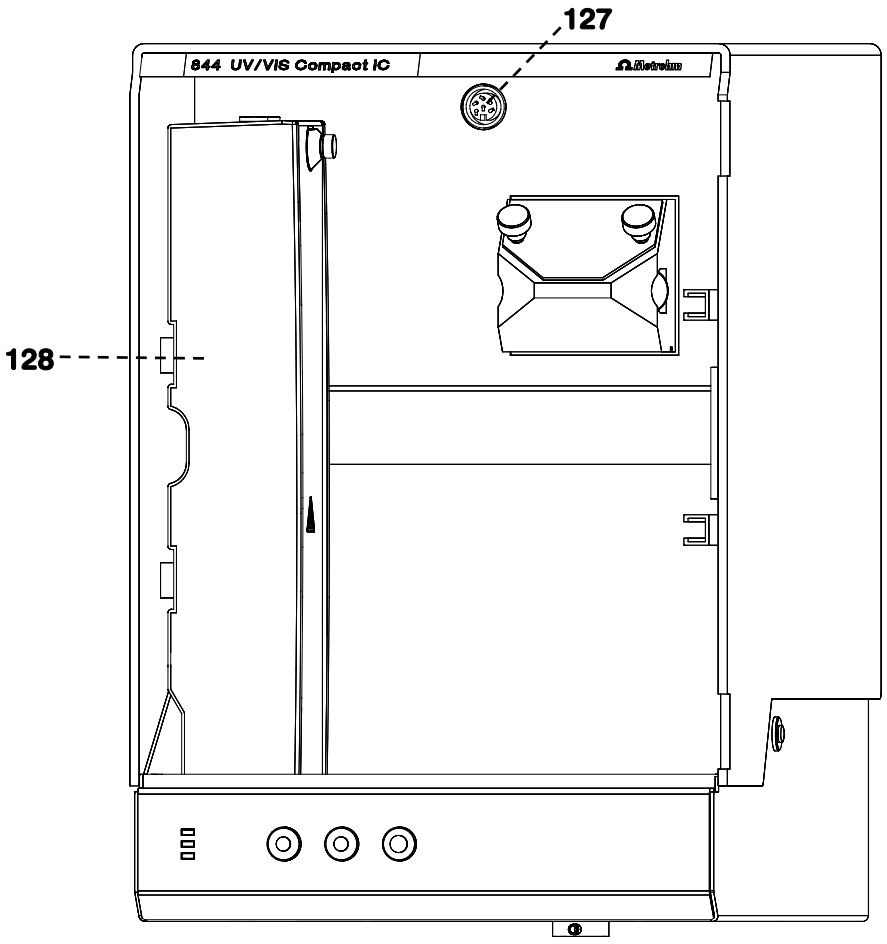


Figure 24: Installing the column heating

127 **IC Column heating 1.820.0500**

128 **Connection for column heating**
with 6.2108.140 Cable

Proceed as follows to install the column heating:

1 **Insert the column heating**

- Carefully place the column heating inside the 844 UV/VIS Compact IC. Pay attention to the capillaries at feedthroughs **115** and **121** (see *Section2.8.4.2*).
- Use the magnetic holders **119** to attach the column heating to their counterparts on the left-hand side inner panel of the 844 UV/VIS Compact IC.

2 **Connect column heating**

- Plug 6.2108.140 Cable into connection **114** of the column heating and connection **127**.

2.9 Detector

The 844 UV/VIS Compact IC is equipped with UV/VIS detector. The eluent (and the sample) are led through a measuring cell (flow-through cell **42**/**62**) and measured spectroscopically. The available light sources are a UV (deuterium) lamp and a VIS (halogen) lamp.

2.9.1 Installing the flow-through cell

With the 2.844.0030 und 2.844.0130, the flow-through cell is already pre-installed!

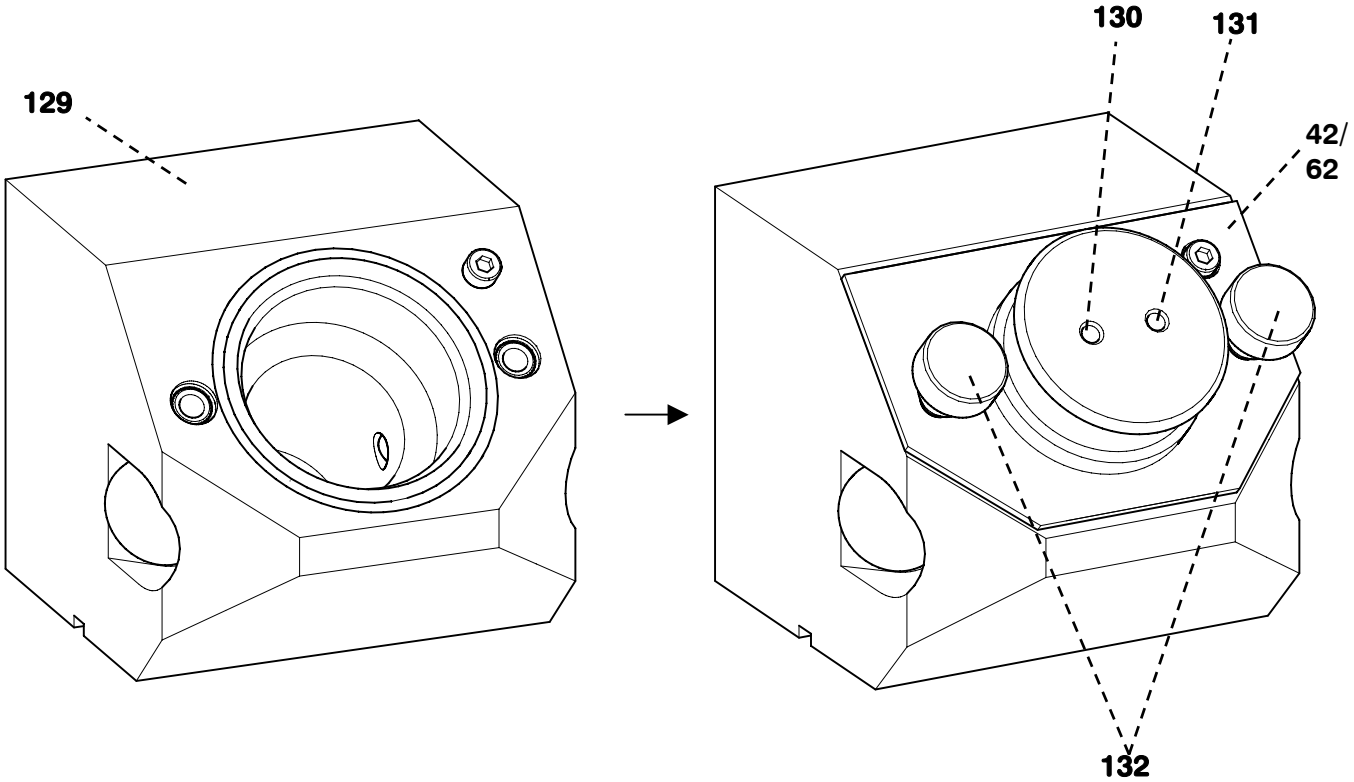


Figure 25: Flow-through cell installation

42 **6.2839.130 Flow-through cell PEEK**

62 **6.2839.100 Steel flow-through cell**

129 **Optical bank**

130 **Flow-through cell outlet "OUT"**
Eluent outlet

131 **Flow-through cell inlet "IN"**
Eluent inlet

132 **Knurled screws**
For fastening flow-through cell **42**/**62**.

To install flow-through cell **42**/**62** proceed as follows:

1 **Remove blank cover**

- Optical bank **129** is delivered with a blank cover. This should be removed.

2 Attach flow-through cell

- Attach flow-through cell **42**/**62** to the optical bank with the knurled screws **132**.

2.9.2 Connect the lamps

Connect the UV (deuterium) and VIS (halogen) lamps as follows:

1 Connect VIS (halogen) lamp

- Plug "VIS lamp connection cable" **13** into "VIS lamp connection" **10**.

2 Connect UV (deuterium) lamp

- Plug "UV lamp connection cable" **11** into "UV lamp connection" **12**.

2.9.3 Flow-through cell tubing connections

Make the flow-through tubing connections as follows:

1 Connect flow-through cell inlet

- *with 2.844.0010:*
  - Attach connection capillary **111** (6.1831.110) connected to column **113** to inlet "IN" **131** of flow-through cell **42** using a compression fitting **64** (6.2744.010).
- *with 2.844.0020:*
  - Attach connection capillary **107** (6.1831.110) to outlet "to detector" **105** of post column reactor **101** using a compression fitting **64**.
  - Attach the other end of connection capillary **107** (6.1831.110) to inlet "IN" **131** of flow-through cell **42** using a compression fitting **64** (6.2744.010).
- *mit 2.844.0030:*
  - Connection capillary **112** (6.2620.120) connected to column **113** is already connected to inlet „IN“ **131** of flow-through cell **62** at delivery**.**
- *with 2.844.0110:*
  - Attach connection capillary **122** (6.1831.120) connected to column **113** to inlet "IN" **131** of flow-through cell **42**using a compression fitting **64** (6.2744.010).
- *with 2.844.0120:*
  - Attach connection capillary **123** (6.1831.120) to outlet "to detector" **105** of post column reactor **101** using a compression fitting **64**.
  - Attach the other end of connection capillary **123** (6.1831.120) to inlet "IN" **131** of flow-through cell **42** using a compression fitting **64** (6.2744.010).
- *with 2.844.0130:*
  - Attach connection capillary **124** (6.1831.120) connected to column **113** to inlet "IN" **131** of flow-through cell **62** using a

pressure screw (6.2620.000) **69.**

2 Connect flow-through cell outlet

- *with 2.844.0010, 2.844.0030, 2.844.0110 and 2.844.0130:*
  - Cut a piece of 6.1831.010 PEEK capillary to the required length and attach one end of it to outlet "OUT" **130** of flow-through cell **42** using a compression fitting **64** (6.2744.010), and place the other end in a waste container.
- *with 2.844.0020 and 2.844.0120:*
  - Attach a 6.1831.100 PEEK capillary (100 cm) to the outlet "OUT" 130 of flow-through cell **42**/ **62** using a compression fitting 64 (6.2744.010), and place the other end in a waste container.
- *with 2.844.0030 and 2.844.0130:*
  - Attach a 6.1831.100 PEEK capillary (100 cm) to the outlet "OUT" 130 of flow-through cell 42/ 62 using a compression fitting 64 (6.2744.010), and place the other end in a waste container.

2.10 Putting into operation

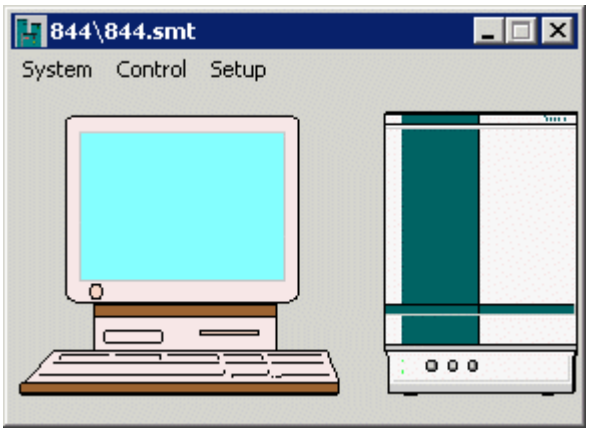
2.10.1 Putting into operation without post column reactor

Before you start injecting sample solutions with Versions **2.844.0010** / **2.844.0030** / **2.844.0110** / **2.844.0130** (without post column reactor) the whole system must be checked for leaks and conditioned with eluent until a stable baseline has been achieved. Proceed as follows:

When inserting the column always make sure that it is inserted correctly in the flow direction shown on the sticker (the arrow must point in the flow direction).

1 Open and connect system

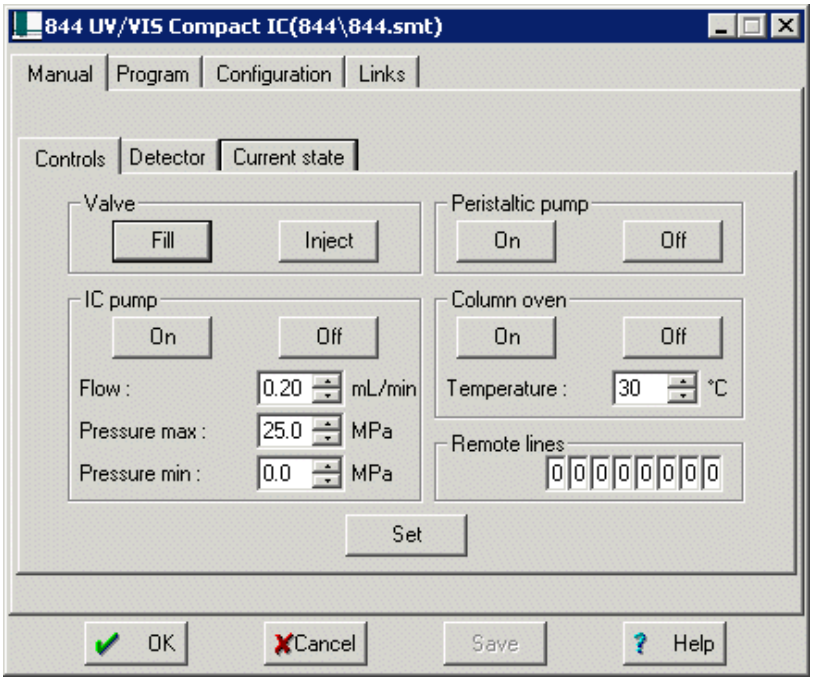
- Start the **«IC Net»** PC program, if it has not already been started.
- Select **File** / **Open** / **System** in the main window. Open the system file created in Section 2.5.4 for the 844 UV/VIS Compact IC.



- Select the **Connect to workplace** item from the **Control** menu of the system window.

2 Open control window

- Double-click on the 844 icon in the system window. The control window for manual operation of the 844 UV/VIS Compact IC appears. Open the subtab **Controls** and set the system parameters (see Section *3.3.1*).



Make sure that the set flow does not exceed the maximum permissible flow for the particular column (see column data sheet).

3 Start system

- Make sure, that the aspirating tubing **82** for the high-pressure pump is immersed in the eluent.
- In the **Control** menu in the system window select the item **Startup hardware (Measure baseline)**. The high-pressure pump

starts up. If column heating has been selected on the tab **Configuration** (see *Section 3.3.1*) then the column heating will also start up. The chromatogram window of the set data recorder opens and the baseline(s) are shown continuously.

4 Check for leaks

- Check all the capillaries and their connections from the high-pressure pump to the detector block for escaping liquid. If eluent is escaping then the corresponding compression fitting should be tightened or a new connection should be made.

5 Condition system

- Rinse the system with eluent until the desired stability of the baseline is reached (normally 30…60 min; if the eluent is changed, the establishment of the ion exchanger equilibrium on the separating column can take longer).
- The instrument is now ready for sample determinations using the selected system.

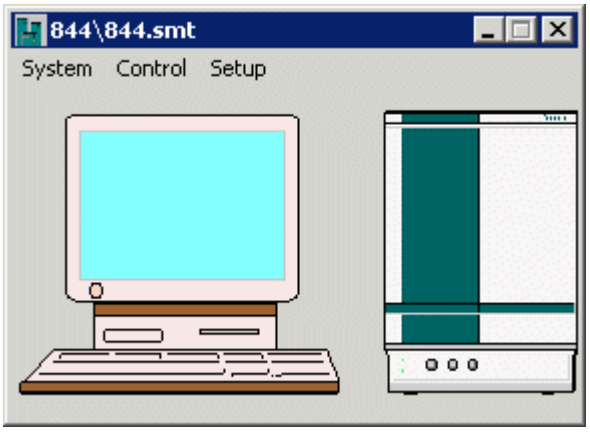
2.10.2 Putting into operation with post column reactor

The two Versions IC 2.844.0020 and 2.844.0120 are supplied with post column reactor **101**. Before sample injection can be done, the whole system must be checked for leaks and conditioned with eluent until a stable baseline has been achieved. Proceed as follows:

When inserting the column always make sure that it is inserted correctly in the flow direction shown on the sticker (the arrow must point in the flow direction).

1 Open and connect system

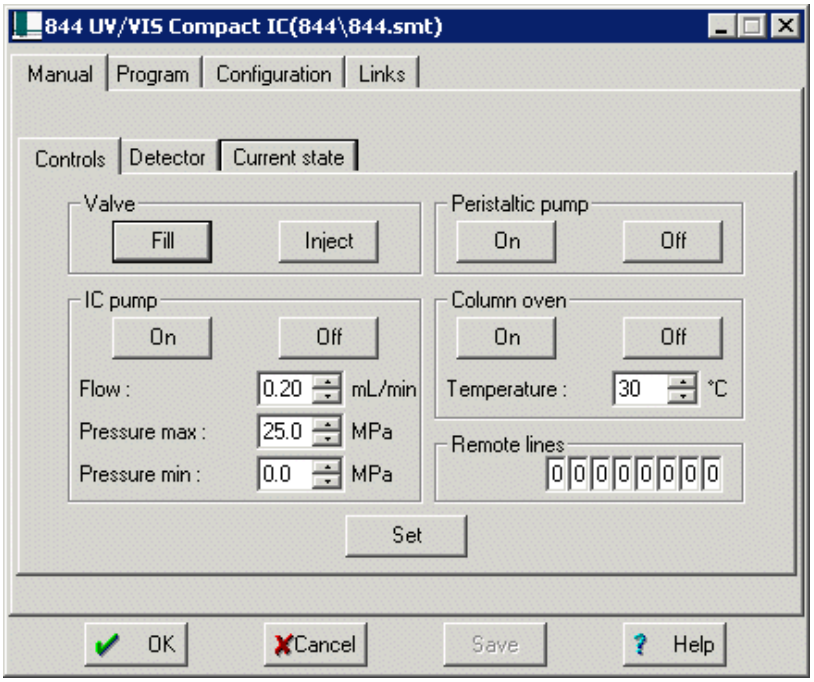
- Start the **«IC Net»** PC program, if it has not already been started.
- Select **File** / **Open** / **System** in the main window. Open the system file created in Section 2.5.4 for the 844 UV/VIS Compact IC.



- Select the **Connect to workplace** item from the **Control** menu of the system window.

2 Open control window

- Double-click on the 844 icon in the system window. The control window for manual operation of the 844 UV/VIS Compact IC appears. Open the subtab **Controls** and set the system parameters (see Ch*ap 3.3.1*).



Make sure that the set flow does not exceed the maximum permissible flow for the particular column (see column data sheet).

3 Start system

- Make sure that aspirating tubing **82** for the high-pressure pump is immersed in the eluent, and that aspirating tubing **108** for the post column reactor is immersed in the reagent.
- In the **Control** menu in the system window select the item **Startup hardware (Measure baseline)**. The high-pressure pump starts up. If they have been selected on the tab **Configuration** (see *Section 3.3.1*) then the peristaltic pump and the column heating will also start up. The chromatogram window of the set data recorder opens and the baseline(s) is/are shown continuously.

4 Set contact pressure for pump tubings

- On tubing cartridge **96** press contact pressure lever **97** upward until the reagent solution is aspirated.
- Then press contact pressure lever **97** upward by 1 more click in order to achieve an optimal contact pressure.

5 Check for leaks

- Check all the capillaries and their connections from the high-pressure pump to the detector block for escaping liquid. If eluent is escaping then the corresponding compression fitting should be tightened or a new connection should be made.

6 Condition system

- Rinse the system with eluent until the desired stability of the baseline is reached (normally 30…60 min; if the eluent is changed, the establishment of the ion exchanger equilibrium on the separating column can take longer).
- The instrument is now ready for sample determinations using the selected system.

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 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).

2.11 Connection of external devices

2.11.1 Connection of the 838 Advanced Sample Processor

The 838 Advanced Sample Processor, which is optionally available from Metrohm, is an automatic sampler for ion chromatography. The 838 Advanced Sample Processor (RS232 interface) is connected to the PC. The control programs are drawn up in the «IC Net» software. In order to synchronize program sequences the 838 Advanced Sample Processor and the 844 UV/VIS Compact IC are connected via the 6.2141.190 Remote cable.

Proceed as follows (after the connection of the 844 UV/VIS Compact IC):

1 Electrical connection 838 – PC

- Connect the RS232 interface of the 838 Advanced Sample Processor to a serial COM interface of the PC using a 6.2134.100 Connection cable(9-pin/9-pin).

2 Electrical connection 844 – 838

- Connect Remote connection **23** of the 844 UV/VIS Compact IC and the Remote connection of the 838 Advanced Sample Processors using a 6.2141.190 Cable (see *838 Instructions for Use*).

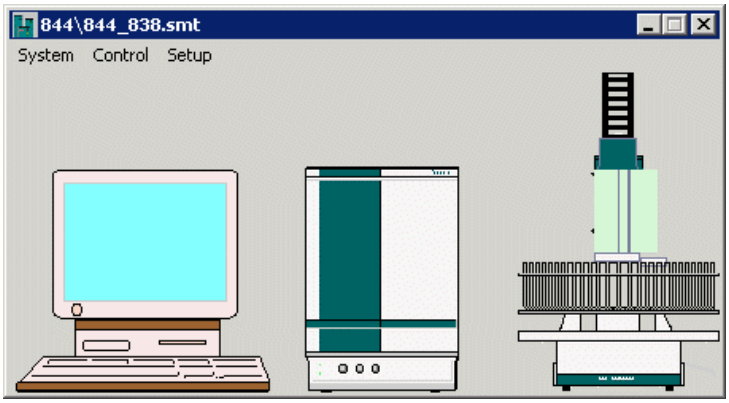
3 Tubing connection 838 – Injection valve

- Screw off aspirating tubing **41** from injection valve **46/60**.
- Cut the PEEK capillary tubing mounted on the 838 Advanced Sample Processor to the required length (so that it can be connected to injection valve **46/60** of the 844).
- Pull the free end of the PEEK capillary tubing through one of the openings of the 844 UV/VIS Compact IC and use a 6.2744.010 PEEK Compression fitting to screw it onto injection valve **46/60**.

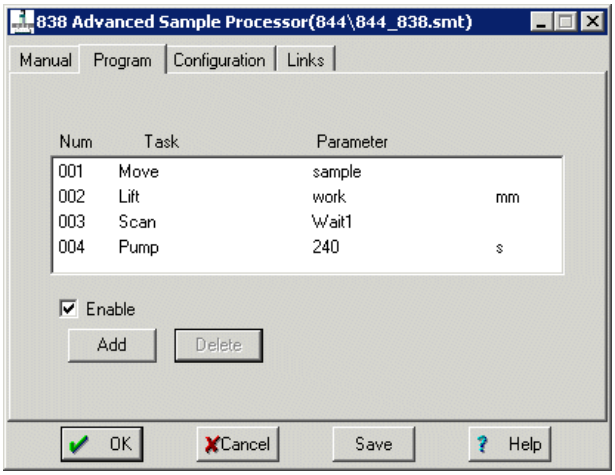
4 Tubing connection Injection valve – Waste

- Loosen connection capillary **33** from injection valve **46/60** (sample outlet).
- Cut a piece of 6.1831.060 PTFE capillary (sample changer accessory) to the required length, attach it to injection valve **46/60** using a 6.2744.010 PEEK compression fitting and place the other end in a waste container.

5 Setting up the 844/838 system

- Select **File** / **Open** / **System** in the main window of the «IC Net » software. Open the system for the 844 UV/VIS Compact IC that you have created in Section *2.5.4*.
- Add the 838 Advanced Sample Processor to the system (via **Setup** / **New devices** / **Install new devices..**, see *«IC Net» Instructions for Use, Section 4.4.4*):
- 

6 Creating a program for the 838

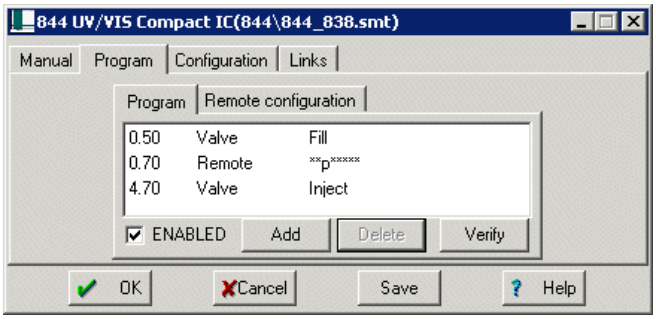
- Open the window with the system settings of the 838 (with a double-click on the 838 icon or via the right-hand mouse key open).
- Click on the **Program** tab. The 838 Advanced Sample Processor is controlled by a command sequence on the **Program** tab.
- Create a program (see *«IC Net» Instructions for Use, Section 6.26.3*):
- 

- At the command **Scan Wait1** the 838 will wait for an incoming Remote signal on line 3 (defined in the subtab **Configuration** / **Scan**). It will receive this Remote signal from a **Remote** command included in the time program of the 844 (see below). The 844 and 838 are synchronized in this way.
- For more detailed information about the control of the 838 Advanced Sample Processors via «IC Net» please refer to *«IC*

Net» Software Instructions for Use, Section 6.26.3.

7 Creating a time program for the 844

- Open the window with the system settings of the 844 (with a double-click on the 844 icon or via the right-hand mouse key open).
- Open the **Program** tab.
- Create a time program:



- The **Remote** command sends a signal to the 838 via Remote line 3. This signal tells the 838 (which is waiting after the **Scan** command) to continue with its command sequence.
- The two **Valve** commands switch the injection valve at the 844 to the positions **Fill** and **Inject**.
- For more detailed information about the control please refer to Section *3.3.1* or *the «IC Net» Software Instructions for Use*.

2.11.2 Connection of the 813 Compact Autosampler

The 813 Compact Autosampler, which is optionally available from Metrohm, is an automatic sampler for ion chromatography. The 813 Compact Autosampler (Remote connection) is connected to Remote connection **23** of the 844 UV/VIS Compact IC using the 25-pin 6.2141.130 Remote cable. The control of the 844 UV/VIS Compact IC takes place using **Remote** commands in the time program of the 844 UV/VIS Compact IC.

Proceed as follows:

1 Electrical connection 844 – 813

- Connect Remote connection **23** of the 844 UV/VIS Compact IC and the Remote connection of the 813 Compact Autosampler using the 6.2141.130 Cable (see *813 Instructions for Use*).

2 Tubing connection 813 – Injection valve

- Screw off aspirating tubing **41** from injection valve **46/60**.
- Cut the PEEK capillary tubing mounted on the 813 Compact Autosampler to the required length (so that it can be connected to injection valve **46/60**. of the 844).
- Pull the free end of the PEEK capillary tubing through one of

the openings of the 844 UV/VIS Compact IC and use a 6.2744.010 PEEK Compression fitting to screw it onto injection valve **46/60**..

3 Tubing connection Injection valve – Waste

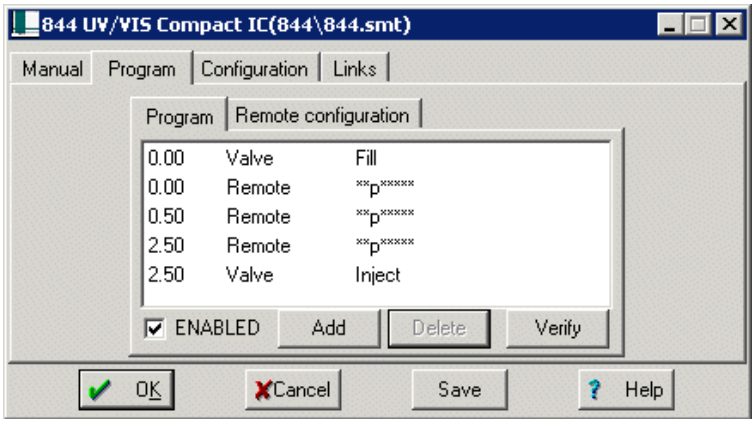
- Loosen connection capillary **33** from injection valve **46/60**. (sample outlet).
- Cut a piece of 6.1831.060 PTFE capillary (sample changer accessory) to the required length, attach it to injection valve **46/60**. using a 6.2744.010 PEEK compression fitting and place the other end in a waste container.

4 Setting a method on the 813

- Use the 813 keyboard on the 813 Compact Autosampler to set the required method (see *813 Instructions for Use*).

5 Creating a time program for the 844

- In the main window of the «IC Net» software select **File** / **Open** / **System**. Open the system for the 844 UV/VIS Compact IC that you have created in Section *2.5.4*..
- Open the window with the system settings of the 844 UV/VIS Compact IC (with a double-click on the 844 icon or via the right-hand mouse key **open**).
- Open the **Program** tab.
- Create a time program:



- The **Remote** command sends a signal to the 813 via Remote line 3. The function of this signal depends on the method selected at the 813 (see 813 Instructions for Use, Section 3.4).
- The two **Valve** commands switch the injection valve of the 844 to the positions **Fill** and **Inject**.
- For more detailed information about the control please refer to *Section 3.3.1* or *the «IC Net» Software Instructions for Use*.

3 Operation

This Section describes only the most important points concerning the operation of the 844 UV/VIS Compact IC. For further details please refer to the «IC Net» Instructions for Use and to the on-line help in the PC program.

3.1 «IC Net» - Terms

System

In the «IC Net» software a **System** contains the devices set under Settings for this system, the created time programs, the data acquisition parameters and the methods that have been optimized for a specific separating column and the determination to be carried out with it. Several systems can be defined and saved as **system files** (***.smt**) in the **Systems** folder (see *«IC Net» Software Instructions for Use, Section 4*). Determinations (single determinations or using a sample table) are started via the system.

Each system is linked to a method.

Method

A **Method** contains all the information necessary for **data acquisition**, **integration**, **peak evaluation** and **results calculation**. It can be regarded as being a skeleton chromatogram, i.e. a chromatogram without any data. Methods are saved as **method files** (***.mtw**) in the **Methods** folder.

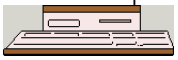
Chromatogram

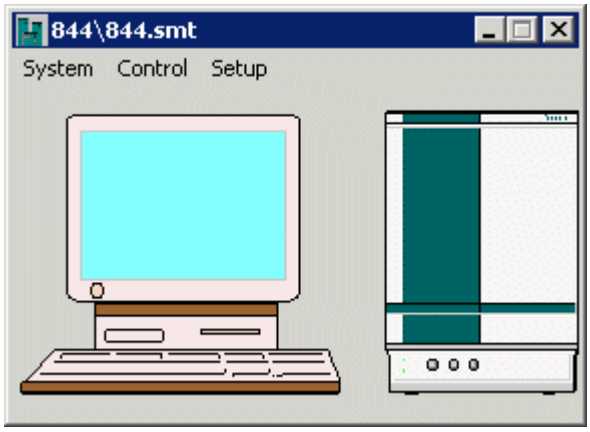
A chromatogram is the graphical presentation of the elution curve (signal vs. time).

Chromatograms are saved as **chromatogram files** (***.chw**) in the **Data** folder. In addition to the measuring data, the chromatogram files also contain the method parameters and system settings used for data acquisition, processing and remote control.

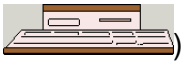
3.2 Measuring operation

3.2.1 Opening a system

A system window is opened with **IC Net** / **File** / **Open** / **System** and the selection of the required system file. It contains symbols for **Data recorder**  (keyboard), **Watch window** (screen) and all **devices** that have been installed in the system. A system window for a system with an 844 UV/VIS Compact IC is shown below:

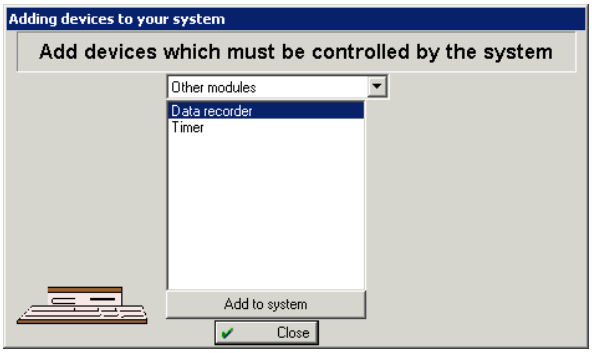


3.2.2 Defining measuring channels

With the 844 UV/VIS Compact IC up to four measuring channels can be recorded simultaneously: **Abs.1**, **Abs.2**, **Abs.3** and **Ch1/Ch2** (three measuring channels for absorption at different wavelengths, as well as the ratio between measuring channel 1 and measuring channel 2). For each measuring channel you should include one data recorder (icon: ) in the system.

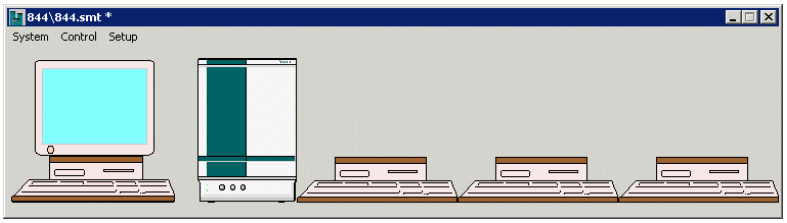
Add a data recorder

Proceed as follows to insert a data recorder: Select **SYSTEM** / **Setup** / **New Devices** / **Install new device..** , the window **ADDING DEVICES TO YOUR SYSTEM** opens. Select **Other modules** in the upper selection list:



Select **Data recorder** in the list and click on **<Add to system>**.

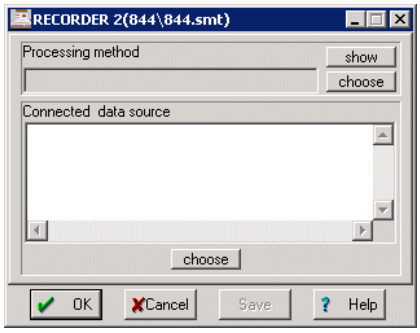
The icons for the data recorders are shown in your system window. An example of a system with four measuring channels is shown below:



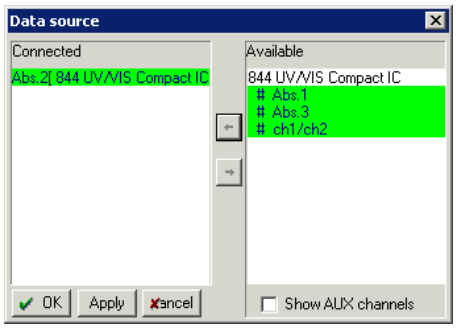
Via **IC NET** / **Options** / **Global preferences** you can arrange the data recorder icons one above the other under **GLOBAL PREFERENCES**.

Assign data sources

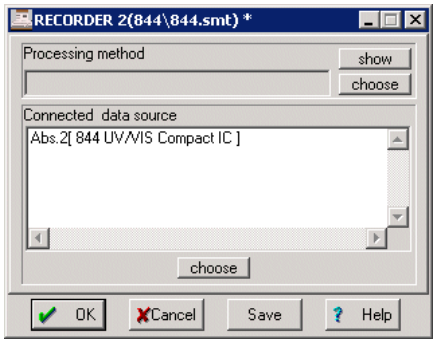
A data source is assigned to each of these data recorders. Click on one of the data recorders with the right-hand mouse key, and select **Setup**. The **RECORDER** window opens.



Click on the lower **<choose>** button. The **DATA SOURCE** window opens. Select one of the data sources that has not been previously connected, and draw it on to the right-hand side by keeping the left-hand mouse key pressed down:



Click on **<OK>**. The connected data source is shown in the **RECORDER** window:

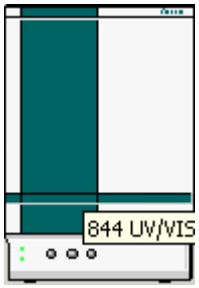


Click on **<OK>** and assign a data source to each data recorder.

3.2.3 Connect a system

The selected system must be linked to the workplace for controlling the instrument and starting determination processes. Systems are linked by selecting **SYSTEM** / **Control** / **Connect to workplace** (see also *Software Instructions for Use «IC Net 2.3», Section 4.3.1*).

3.2.4 Instrument icon



When you click with the right mouse button on the instrument icon, you will see the following menu:

Open	Opens the window for **System Settings.**
Hardware	Opens the window for **Hardware Settings.**
Spectrum window	Opens the **SPECTRUM WINDOW**.
Unlink	Unlink device from the system.

3.2.5 Hardware start/stop and baseline recording

Start

Starting the hardware (by selecting **SYSTEM** / **Control** / **Startup hardware**) on the 844 UV/VIS Compact IC includes starting the high-pressure pump and, depending on the system start values **Startup with hardware** defined on the **Configuration** tab, starting the UV lamp, the VIS lamp, and, if present, the column heating and peristaltic pump.

At the same time **Recording the measuring signal** is started, using the method defined in the system. The measuring signal is recorded independently from the time for the chromatogram set under **Duration**, until either data acquisition is stopped with **SYSTEM** / **Control** / **Stop data acquisition** or a new determination is started. Alternatively data recording can also be interrupted by clicking on in the chromatogram window. In this case the user is asked whether the recorded baseline is to be saved or not.

Stop

By selecting **SYSTEM** / **Control** / **Shutdown hardware** the high-pressure pump, UV lamp, VIS lamp and, if present, the column heating and the peristaltic pump of the 844 UV/VIS Compact IC will be stopped immediately. The current determination and the processing of the active sample table will also be stopped. In addition, the remote output lines will be set to the values defined for the parameter **PowerON values** on the tab **Outputs** in the **HARDWARE** window.

3.2.6 Determination start/stop

Start

By selecting the menu item **SYSTEM** / **Control** / **Start determination** a determination is **started** with the settings of the selected system. At the start the system start values **Startup with hardware** defined for the system

(on the tab **Configuration**) will be set on the 844 UV/VIS Compact IC. Depending on the **Start mode** setting the time program and data recording will either be started immediately (for **Start with determination**) or only when the injection valve is switched to the position "INJECT" (for **Start with inject**).

Stop

If **SYSTEM** / **Control** / **Stop determination** is selected then the current determination is **stopped**. Data recording and the time program are stopped immediately.

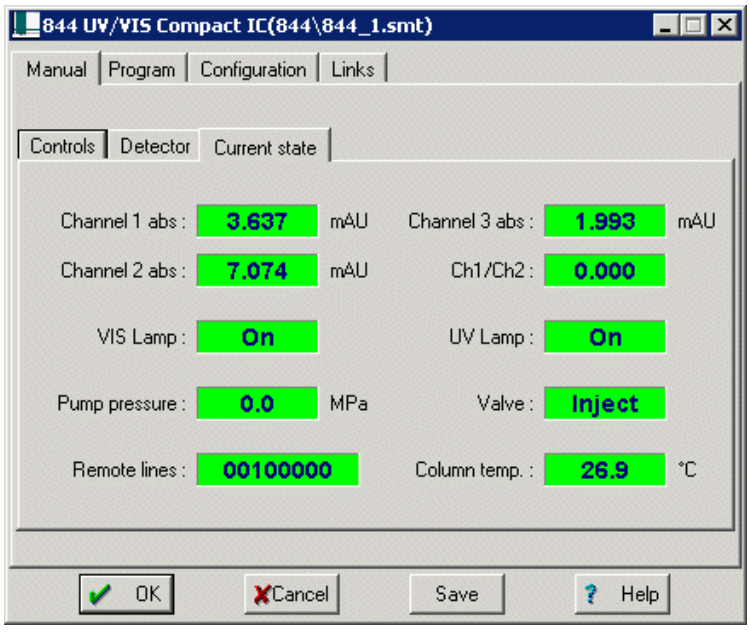
Alternatively the determination can also be stopped by clicking on in the chromatogram window. In this case the user will always be asked if the recorded baseline is to be saved or not.

3.3 Settings

3.3.1 Instrument control for connected system

A double-click on the device symbol or selecting the menu item **Open** with the right-hand mouse key opens the window for the system settings. For a connected system the tab **Manual** with the subtab **Current State** appears on which the current values are shown.

Current state



Channel 1 abs, mAU Live display of the absorption in channel 1.

Channel 2 abs , mAU Live display of the absorption in channel 2.

Channel 3 abs, mAU Live display of the absorption in channel 3.

Ch1/Ch2 Live display of the absorption ratio of channel 1 and channel 2.

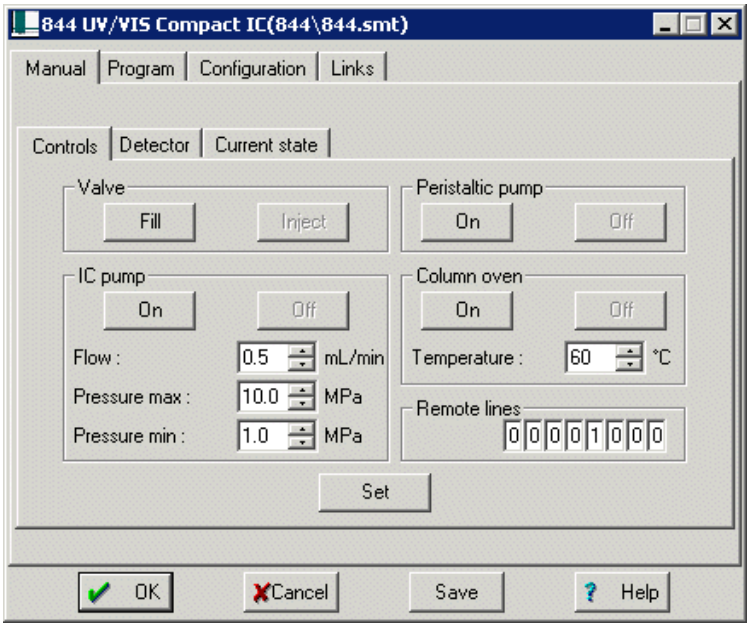
VIS Lamp Live display of the status of the VIS lamp.

UV Lamp Live display of the status of the UV lamp.

Pump pressure, MPa	Displays the currently measured pressure of the high-pressure pump (units depend on the settings made under **IC NET** / **Global preferences**).
Valve	Live display of the position of the injection valve.
Remote lines	Live display of the status of the 8 remote lines.
Column temp., °C	Live display of the temperature in the column oven.

Controls

On the subtab **Controls** injection valve **46/60**., peristaltic pump **49**, high-pressure pump **27/54**, column heating **115** and remote lines can be manually controlled. In addition, the parameters for the high-pressure pump and column heating temperature can also be set:



Valve	Injection valve
<Inject>	Switch injection valve to "Inject" position.
<Fill>	Switch injection valve to "Fill" position.
Peristaltic pump	Peristaltic pump
<On>	Start peristaltic pump (only enabled, with versions 2.844.0020 or 2.844.120).
<Off>	Stop peristaltic pump (only enabled, with versions 2.844.0020 or 2.844.120).
IC pump	High pressure pump
<On>	Start high pressure pump.
<Off>	Stop high pressure pump.
Flow, mL/min	Set value for flow rate of IC pump. Entry range: **0.20** ... **2.50 mL/min**

Pressure max, MPa Value for maximum switch-off pressure for high-pressure pump. Once it has been set this value will be monitored, even if there is no connection to the PC (units depend on the settings made under **IC NET** / **Global preferences**).
Entry range: **0.0** ... **35.0 MPa**

*If the **Flow** is higher than 1.5 mL/min, the defined **Pressure max** must not exceed 25.0 MPa (250 bar).*

Pressure min, MPa Value for minimum switch-off pressure for high-pressure pump. Once it has been set this value will be monitored, even if there is no connection to the PC (units depend on the settings made under **IC NET** / **Global preferences**).
Entry range: **0.0** ... **35.0 MPa**

Column oven Column oven

<On> Turn column oven on (only enabled, if a column oven is connected).

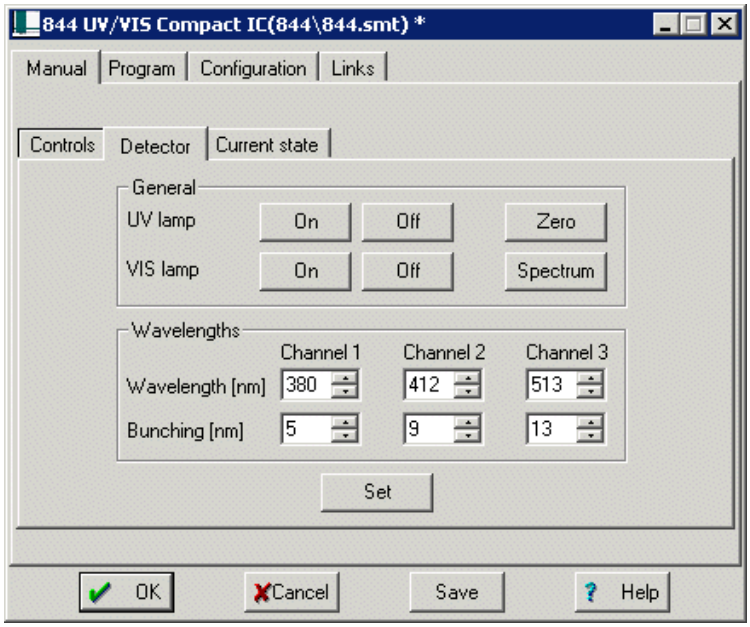
<Off> Turn column oven off (only enabled, if a column oven is connected).

Temperature, °C Set value for temperature in the column oven.
Entry range: **0 ... 75 °C**

Remote lines Set values for remote line settings 1…8.
Selection: **0**, **1**

Detector

On the subtab **Detector** the UV/VIS detector **43/61** can be controlled manually. The parameters for the measurement can also be set:



UV lamp UV lamp

<On> Turn UV lamp on.

<Off> Turn UV lamp off.

VIS lamp	VIS lamp
<On>	Turn VIS lamp on.
<Off>	Turn VIS lamp off.
<Zero>	Records a new zero spectrum. The zero spectrum is a reference spectrum. It should be recorded at a time at which there is no sample in the measuring cell. It is used for calculating the absorption spectrum.
<Spectrum>	Opens the **SPECTRUM** window (see Section *3.3.3*).
Wavelength, nm	Sets the wavelengths at which the chromatograms are to be recorded (for max. three measuring channels).
Bunching, nm	Sets the bunching of the wavelengths defined above.
Channel 1, nm	Measuring channel 1.
Channel 2, nm	Measuring channel 2.
Channel 3, nm	Measuring channel 3.

The relationship between **Wavelength** and **Bunching** is explained by using an **example**:

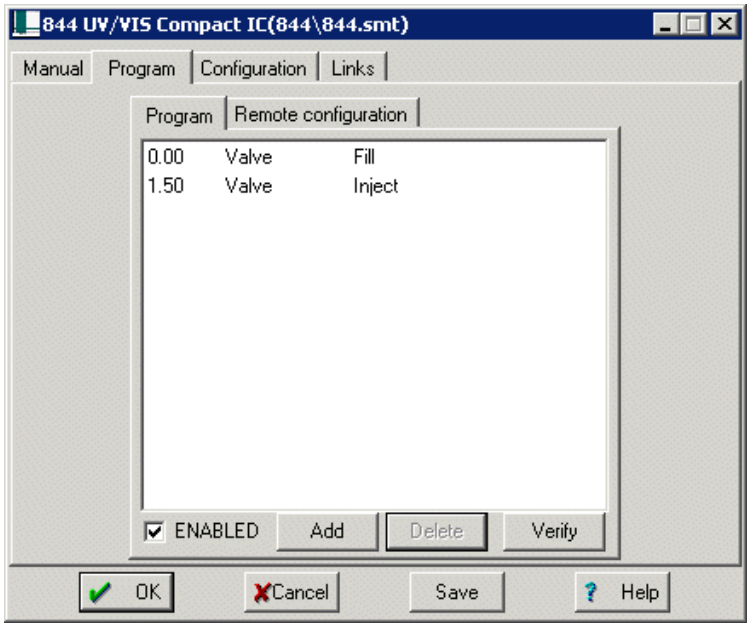
Set values: **Wavelength** = 500 nm, **Bunching** = 21 nm

An **upper** and a **lower limit** for the measured wavelengths of the corresponding measuring channel are calculated from these values. For these calculations the following **equation** applies: subtract "1" from the **Bunching** value, divide the new value by 2, and subtract/add the resulting value from/to the **Wavelength** value.

Result: wavelengths between 490 nm (lower limit) and 510 nm (upper limit) will be included in the chromatogram.

Time program

On the **Program** tab of the system settings window a user-defined time program for instrument control can be entered. This program is started automatically as defined in the **Start mode** window (see *Section 4.3.3*) either at the moment the determination is started (**Start with determination**) or at the moment the sample is injected (**Start with inject**).



The **Program** tab contains the two following subtabs:

Program	Main time program with all program steps.
Remote configuration	Possibility for creation of user-defined remote commands.

Program

On the **Program** subtab, program steps including time, program instruction and parameter can be entered.

Time (1st column)	Time at which program instruction is applied. Entry range: **0.0 ... 999.9 min** If no time is entered, the program instruction is applied together with the last instruction with time entry.
Command (2nd column)	Program instruction (see *List of program instructions*). In addition to these predefined instructions, user-defined remote commands can be entered if activated on the **Remote configuration** tab.
Parameter (3rd column)	Parameter for program instruction (see *List of program instructions*).

ENABLED	Enable program start (a disabled program is not started).
<Add>	Add new program instruction.
<Delete>	Delete selected program instruction.
<Verify>	Test the time program (error messages are displayed if program is wrong).

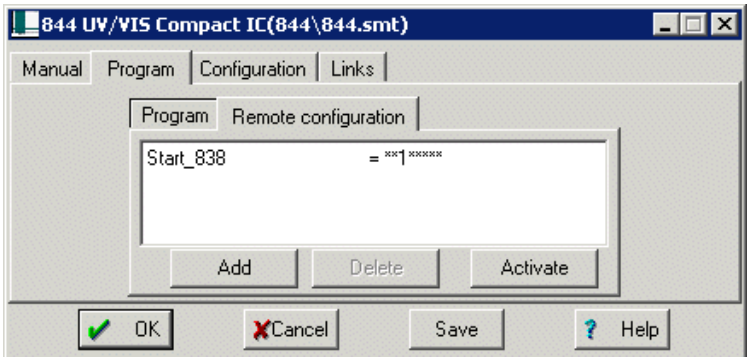
List of program instructions

The following program instructions can be added to the time program on the **Program** subtab:

Remote	**0, 1, *, p**	Set **remote output lines** 1...8 to the desired values. For entry of the first value, enter **1**, **0**, **p** or *****. For entry of the other values, move the cursor in front of the value to be changed and enter **1**, **0**, **p** or *****.
Valve	**Inject, Fill**	Switch **injection valve** to "INJECT" or "FILL" position.
ICPump	**on, off**	Switch **on** or **off** the **high-pressure pump**.
Flow	**0.2 ... 2.5 mL/min**	Set **flow rate** of the high-pressure pump to the desired value.
Pmax	**0.0 ... 35.0 MPa**	Set **maximum pressure limit** for the high-pressure pump to the desired value.
Pmin	**0.0 ... 35.0 MPa**	Set **minimum pressure limit** for the high-pressure pump to the desired value.
Peristaltic	**on, off**	Switch **on** or **off** the **peristaltic pump**.
Wavelength_1..3	**190 ... 900 nm**	Set **wavelength** of the corresponding measuring channel on the desired value.
Bunching_1..3	**1 ... 101 nm**	Set **bunching** of the corresponding measuring channel on the desired value.
UV_Lamp	**on, off**	Switch **on** or **off** the **UV lamp**.
VIS_Lamp	**on, off**	Switch **on** or **off** the **VIS lamp**.
Zero		Record a new **zero spectrum**.

Remote configuration

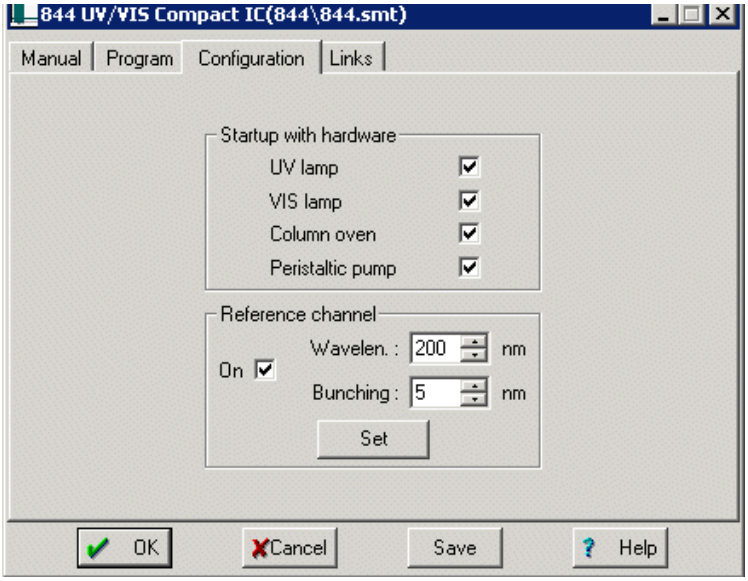
On the **Remote configuration** subtab user-defined remote commands can be defined, which can be inserted into a time program.



Name (1st column)	User-definable name of the remote command (e.g. **Start_838**).
Remote command (2nd column)	Setting the remote output lines 1…8. Selection: **0** (line off, inactive, open) **1** (line on, active, 0 V) **p** (pulse) ***** (leave line in current status) For entry of the first value, enter **1**, **0**, **p** or *****. For entry of the other values, move the cursor in front of the value to be changed and enter **1**, **0**, **p** or *****.
<Add>	Add new remote command.
<Delete>	Delete selected remote command.
<Activate>	Activate the defined remote commands for insertion into the time program.

Configuration

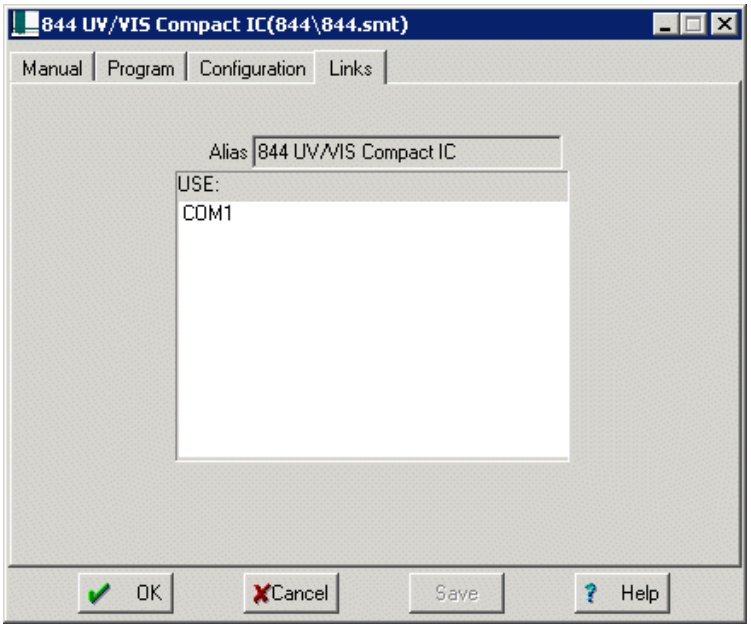
The **Configuration** tab in the system settings window contains configuration settings for the 844 UV/VIS Compact IC.



Startup with hardware	The activated devices will be started with **Startup hardware** or at the start of a determination.
UV lamp	If this option is switched off the UV lamp will not be switched on at **Startup hardware** or at the start of a determination.
VIS lamp	If this option is switched off the VIS lamp will not be switched on at **Startup hardware** or at the start of a determination.
Column oven	If this option is switched off the column heating will not be switched on at **Startup hardware** or at the start of a determination.

Peristaltic pump	If this option is switched off the peristaltic pump will not be switched on at **Startup hardware** or at the start of a determination.
Reference channel	Reference channel.
On	If this option is switched on the absorption of the measuring and reference channels will be shown as a comparative value.
Wavelength, nm	Sets the wavelength of the reference channel.
Bunching, nm	Sets bunching for the wavelength defined above.

Links



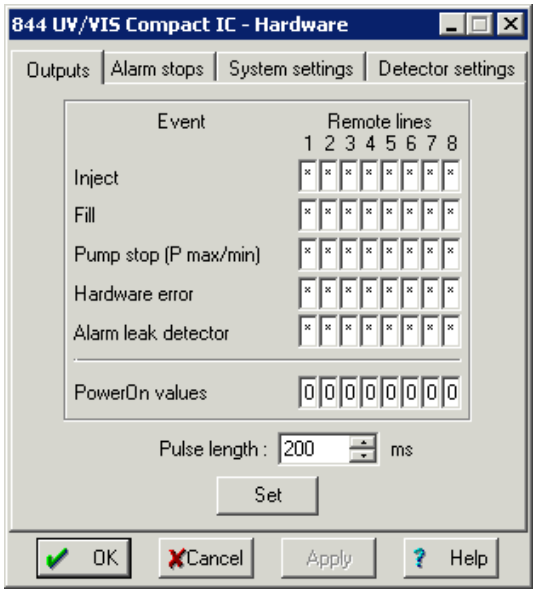
The **Links** tab in the window for the system settings serves to select and set the COM port (for details see *Software Instructions for Use «IC Net 2.3», Section 5.2.4 Links*).

3.3.2 Hardware settings

Selection of the **Hardware** menu item using the right mouse button opens the hardware settings window consisting of the four tabs **Outputs**, **Alarm stops**, **System settings** and **Detector settings**.

Outputs

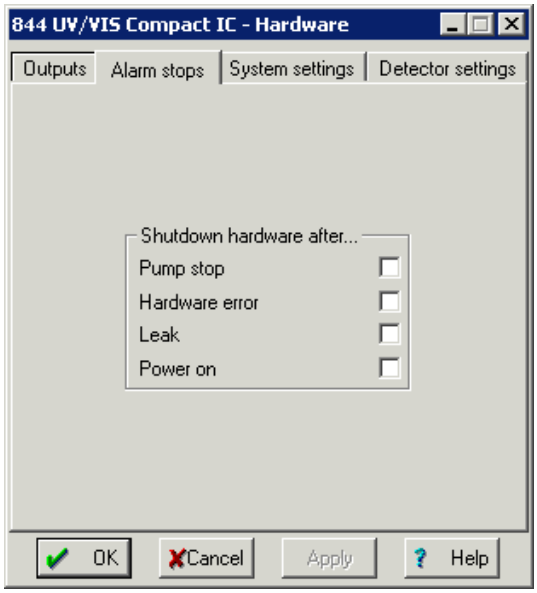
The **Outputs** tab of the hardware settings window defines remote output signals to be set automatically if specific events occur.



Event	Events for automatic remote signal output:
Inject	Switching of the injection valve to the "INJECT" position.
Fill	Switching of the injection valve to the "FILL" position.
Pump stop (P max/min)	Pump stopped because pressure limits are exceeded.
Hardware error	Hardware error detected at the 844 UV/VIS Compact IC (high-pressure pump, injection valve, or peristaltic pump not working correctly).
Alarm leak detector	Internal leak.
PowerOn values	Output lines 1… 8 will be set to the values defined here after the instrument has been switched on or after an emergency stop with **Shutdown hardware**. Selection: **0**, **1**
Pulse length	Length of a pulse in ms.

Alarm stops

The **Alarm stops** tab of the hardware settings window defines the events for which the instrument is stopped immediately. At an alarm stop, high-pressure pump and peristaltic pump are stopped immediately, the running determination and the active sample queue are also stopped.

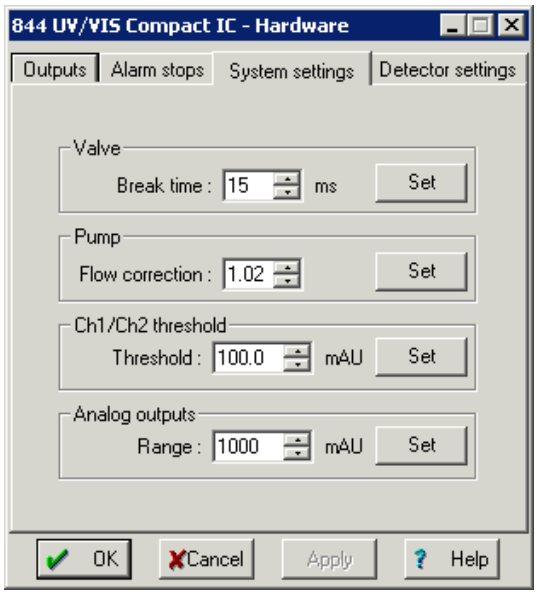


Shutdown hardware after.. Event for alarm stop:

Pump stop	Pump stopped because pressure limits are exceeded.
Hardware error	Hardware error detected at the 844 UV/VIS Compact IC (high pressure pump, injection valve or peristaltic pump not working correctly).
Leak	Leak detector has detected solvent in the instruments interior.
Power on	Temporary power failure at the 844 UV/VIS Compact IC hardware.

System settings

On the tab **System settings** break times for the injection valve and flow rate corrections for the high-pressure pump are defined.



Break time, ms	Modification of the break time for the injection valve. Entry range: **1** ... **99 ms**

Flow correction

Factor for correction of the difference between displayed and actual flow rate of the high-pressure pump.
Range: **0.9** ... **1.25**

The correction factor is determined as follows by measuring the actual flow rate using a graduated cylinder:

$$\textbf{Flow correction} = \frac{\textit{Displayed flow rate}}{\textit{Measured flow rate}}$$

*The product of parameter **Flow correction** and parameter **Flow** (on the tab **Controls**) must not exceed 2.75 mL/min.*

Ch1/Ch2 threshold

Limit for measuring channel ratio Ch1/Ch2.

Threshold, mAU

As long as the absorption value(s) from **channel 1**, **channel 2** or **both** lie beneath the defined **Threshold** (limit) the value for the Ch1/Ch2 ratio will not be calculated.

Analog Outputs

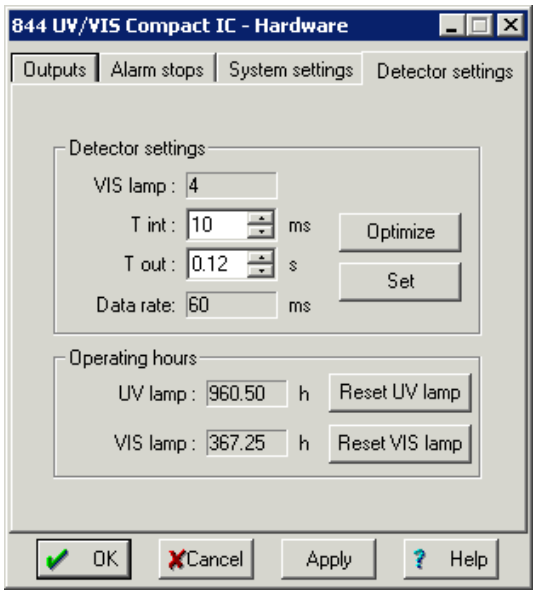
Settings for analog signal output.

Range, mAU

The defined value is equivalent to 1 V for the analog signal output.
Entry range: **0.1** ... **2000.0 mAU**

Detector settings

On the tab **Detector settings** measuring settings are defined.



Detector settings

Settings for UV/VIS detector **43/61**.

VIS lamp

Display of the voltage of the VIS lamp.

T int, ms Integration time.
Entry range: **10** ... **254 ms**

T out, s Measuring time per data point.
Entry range: **0.05** ... **2.00 s**

Data rate Effective measuring time per data point. The **Data rate** is the particular whole number multiple of the value **T int** that is closest to the value **T out**.

The measurement of a data point is explained by using an **example**:

Set values: **T int** = 15 ms, **T out** = 0.1 s

The calculated **Data rate** is 105 ms (the particular multiple of **T int** that is closest to the value **T out**; in our example 7 times 15 ms). This means that the integration will be carried out 7 times (each time for 15 ms) and then averaged to give a data point.

<Optimize> Optimizes **T int** and adjusts the VIS lamp.
It should be done

- after exchanging a lamp (UV or VIS)
- if parts of the intensity spectrum are in the overload (> 60'000 , peaks cut)
- if the maximum of the intensity spectrum of dist. water is too low (below 33'000)

*Before clicking **<Optimize>**, the flow-through cell should be rinsed and filled with dist. water. There must be no air bubbles in the flow-trough cell when clicking **<Optimize>**.*

Operating hours Operating hours of the lamps.

UV lamp, h Display of the operating hours of the UV lamp.

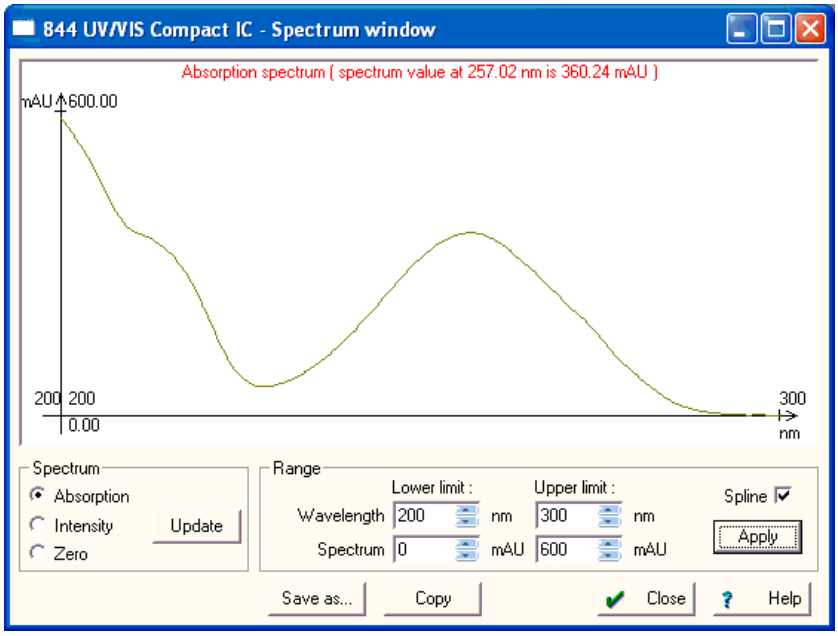
<Reset UV lamp> Set **operating hours of the UV lamp** to 0. Click it after replacing the UV lamp.

VIS lamp, h Display of the operating hours of the VIS lamp.

<Reset VIS lamp> Set **operating hours of the VIS lamp** to 0. Click it after replacing the VIS lamp.

3.3.3 Spectrum window

The **SPECTRUM WINDOW** can be opened with a right-hand mouse-click on the 844 icon and then selecting the menu item **Spectrum window**, or via the Spectrum button on the subtab **Manual**/**Detector**.



A selection can be made from three different spectra, the absorption spectrum, intensity spectrum and the zero spectrum. Please note that each time you click on **Absorption**, **Intensity** or **Zero** the function of the **<Update>** button will be triggered.

<Update>

The 844 measures the current intensity spectrum and sends it together with the last zero spectrum to have been recorded to <IC Net>. The absorption spectrum is recalculated from these two spectra.

Absorption

The absorption (with the units mAU) is given on the y-axis as a function of the wavelength (x-axis). The absorption values are calculated for all measured wavelengths and shown as spectrum. The calculation formula for the absorption value is shown here as an example for the wavelength set for measuring channel 1:

$$Abs = \log \frac{Int_{\lambda 1 zero}}{Int_{\lambda 1 akt}}$$

where:

$Int_{\lambda 1 zero}$ The intensity measured when recording the zero spectrum at the wavelength set for measuring channel 1.

$Int_{\lambda 1 akt}$ The actual intensity measured at the wavelength set for measuring channel 1.

If you are working with a reference channel (can be activated on the subtab **Configuration**) the formula is as follows:

$$Abs = \log \frac{Int_{\lambda 1zero}}{Int_{\lambda 1akt}} - \log \frac{Int_{\lambda refzero}}{Int_{\lambda refakt}}$$

where:

$Int_{\lambda refzero}$ The intensity measured when recording the zero spectrum at the wavelength set for the reference channel.

$Int_{\lambda refakt}$ The actual intensity measured at the wavelength set for the reference channel.

Intensity The intensity (y-axis) is given as a function of the wavelength (x-axis).

Zero A click on **Zero** shows the last zero spectrum to have been recorded (a zero spectrum is recorded by clicking on the Zero button on the subtab **Manual**/**Detector** of the 844 control window).

The zero spectrum is a reference spectrum. It should be recorded at a time at which there is no sample in the measuring cell. It is used for calculating the absorption spectrum (see above formulas).

Wavelength, nm Sets the shown x-axis range
Entry range: **190 ... 900 nm** , (standard settings 190 nm and 900 nm, **Upper limit** must be higher than **Lower limit**).

Spectrum Sets the shown y-axis range
Standard settings: **0 ... 100.**

Spline Activates curve smoothing.

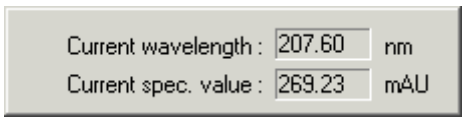
<Apply> Send values to the 844 UV/VIS Compact IC.

<Save as> Opens the dialog for entering the path and file name. Saves the last recorded spectrum in the selected .cvs-file. Format: 2 lines of floating numbers (first line: wavelength, second line: absorption or intensity).

<Copy> Copies plot into clipboard.

<Close> Closes window.

If a right-hand mouse click is made in the spectrum window the wavelength **Current wavelength** and the corresponding absorption value **Current spec. value** will be shown.



4 Notes - Maintenance - Faults

4.1 Practical notes on ion chromatography

4.1.1 Separating columns

Separation efficiency

The attainable quality of analyses with the 844 UV/VIS Compact IC depends to a large extent on the separation efficiency of the column used. When purchasing an IC column you should ensure that the separation efficiency suffices for the analysis problems at hand. Ascertain the **characteristic data of the IC column** on the standard chromatogram enclosed with the column such as capacity factors, selectivity, plate number and resolution and check these data with your own measurements. If any difficulties arise, you should always first check the quality of the column by recording a **standard chromatogram**.

Detailed information about the separating columns available from Metrohm can be found in the data sheet accompanying your separating column, in the **Metrohm IC Column Catalog**, which is available from your local Metrohm agency, or on the Internet under http://www.metrohm.com in the ion chromatography product sector. Information about special IC applications can be found in the relevant **"Application Bulletins"** or **"Application Notes"**; these are available on the Internet under http://www.metrohm.com in the applications sector, or can be requested free of charge from your local Metrohm agency.

Protection

To protect the column against foreign particles which could have an adverse influence on the separation efficiency, we advise you to subject both the eluents and all samples to **microfiltration** (0.45 µm filter) and to siphon the eluent through the **6.2821.090 Aspirating Filter**.

In order to avoid contamination by particles it is advisable to mount an **in-line filter** between the pump and injection valve. In the 844 UV/VIS Compact IC a **6.2821.120 PEEK filter unit** / **6.2620.180 Filter unit Steel** is already mounted (see *Section 2.3.5* / *2.3.6*).

The use of readily interchangeable **precolumns** serves to protect the actual separating columns and increase their service life appreciably. The precolumn that is suitable for your separating column can be found in the **Metrohm IC Column Catalog** which is available from your local Metrohm agency, the data sheet accompanying your separating column, the product information about separating columns that can be found under http://www.metrohm.com, ion chromatography products, or let your agency advise you directly.

Storage

Always store the separating columns sealed when not in use and filled in accordance with the manufacturer's specifications.

Regeneration

If the separation properties of the column have deteriorated, it can be regenerated in accordance with the column manufacturer's specifications. With the separating columns available from Metrohm, the instructions for regeneration can be found on the leaflet enclosed with every column.

In the case of separating columns with carrier material based on silica, ***only solutions with pH 2…7*** *may be used for regeneration, otherwise the columns could be damaged.*

4.1.2 High-pressure pump

Pulsation dampener

The **MF 6.2620.150 Pulsation dampener** belongs to the standard accessories of the PEEK versions of the 844 UV/VIS Compact IC; its installation is described in *Section 2.6.2*. It is used to reduce interfering pulsation in highly sensitive measurements and also protects the column material against pressure shocks caused by the injection.

The two steel versions 2.844.0030 and 2.844.0130 are operated without pulsation dampener.

Maintenance

To protect the pump against foreign particles we advise you to subject the eluent to **microfiltration** (0.45 µm filter) and siphon the eluent through the **6.2821.090 Aspirating filter**.

In many cases an unstable baseline (pulsation, flow fluctuations) can be traced to contaminated valves or faulty, leaky piston seals.

Contaminated valves are cleaned by rinsing with water, RBS solution or acetone (see *Section 4.2.4*). When the cleaned valves are reinstalled you must ensure that the flow direction is correct.

The **replacement of piston seals** is described in *Section 4.2.4*.

It is essential to make sure that **no precipitation** can occur (see also *Section 4.1.3*). This could lead to dirty valves, pressure increases and, in extreme cases, to scratched pistons.

4.1.3 Eluents

Treatment

For the preparation of the eluents only chemicals of a purity degree of at least "**p.a.**" should be used. Use eluents that are recommended for spectroscopic detection. For diluting please use only **high purity water**.

Fresh eluents should always be **microfiltered** (0.45 µm filter) and **degassed** (with N_2, He or vacuum). For alkaline eluents and eluents with low buffering capacity one should preferably use a **CO_2 absorber** (see *Section 2.6.3*).

The supply vessel containing the eluent must be closed as tightly as possible to avoid excessive evaporation. This is primarily important with eluents containing organic solvents (e.g. acetone), the evaporation of which can lead to drifts in the long term. If work is performed in a very sensitive range, even if one drop of condensate falls back in the eluent this can cause a noticeable change in the background conductivity.

Eluent change

When changing the eluent you must make sure that **no precipitation** can occur. This means that solutions used in sequence must be miscible. If the system needs to be rinsed with organic solvents then it may be necessary to use several solvents with increasing or decreasing lipophilicity (e.g. water ↔ acetone ↔ chloroform).

4.1.4 Peristaltic pump

The 6.1826.110 Pump tubing used in the peristaltic pump is a consumable with a limited working life. This is why you should replace the tubing at regular intervals; when in continuous use this should be approx. every 4 weeks (see *Section 4.2.5*).

The working life of the pump tubing depends to a great extent on the contact pressure, so make sure that this is set correctly according to the instructions given in Section *2.10.2* and, if the pump is to be switched off for a longer time, lift up tubing cartridge **96** by fully loosening snap-action lever **98** on the right-hand side (in this way the set optimal contact pressure is retained).

The 6.1826.110 Pump tubing is made from PVC and must therefore not be used for rinsing with solutions containing organic solvents. In this case you must use different pump tubing material, or use a different pump for rinsing.

4.1.5 Connections

All connections between injection valve, column and detector must be as short as possible, have a low dead volume and be absolutely tight. The PEEK capillary after the detector block must be free from constriction (the measuring cell is tested to 5 MPa = 50 bar back pressure).

With the PEEK versions **2.844.0010**, **2.844.0020**, **2.844.0110** and **2.844.0120** only PEEK capillaries are used in the high pressure area. Use PEEK capillaries with 0.25 mm i.d. for the capillary connection between injection valve **46** and UV/VIS detector **43**.

With the Steel versions **2.844.0030** and **2.844.0130** only Steel capillaries are used in the high pressure area.

4.2 Maintenance and servicing

4.2.1 General information

Care

The 844 UV/VIS Compact IC 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.

Spilled chemicals and solvents should be wiped up immediately. It is especially important to protect the plug connections at the rear of the instrument (particular the mains plug) against contamination.

Although constructional measures have been designed to virtually eliminate such a situation, should corrosive media penetrate the interior of the instruments the mains plug of the 844 UV/VIS Compact IC must be immediately disconnected to prevent extensive damage to the instrument electronics. Inform Metrohm service if your instrument(s) have been damaged in such a way.

The instrument must not be opened by untrained personnel. Please comply with the safety notes in Section 1.4.1.

Maintenance by Metrohm service

Maintenance of the 844 UV/VIS Compact IC 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.

4.2.2 Shutdown

If the 844 UV/VIS Compact IC is shut down for a considerable length of time, the entire IC system (**without** column) must be **rinsed free from salt** with methanol/water (1:4) to avoid crystallization of eluent salts with the corresponding subsequent damage.

The connections to the column must be removed for rinsing; the two inlet and outlet capillaries are connected directly with a coupling.

Before taking it back into operation, rinse the system with eluent (**before** the connection of the separation column).

4.2.3 Changing separating columns

It is recommended that the precolumn is also changed each time you change the separation column). In principle the precolumn requires changing more frequently then the separating column.

Identical separation system

If you wish to replace an IC separating column by a column of the same type, proceed as follows:

1 Remove old column

- Switch off high-pressure pump and wait for pressure to drop.
- With column heating: screw off knurled screws **116**, remove cover **117**.
- Screw off the column connection capillaries (both sides) from the column or precolumn.

2 Connect new column to injection valve

- Remove end caps from column **113**.
- Screw inlet end of column **113** (observe flow direction) onto column inlet capillary **47**/**110** or onto the precolumn (see *Section 2.8.1*).

3 Rinse column

- Place beaker beneath the column outlet.
- Switch on high-pressure pump and rinse column with eluent for approx. 10 min, then switch off pump.

4 Connect column to detector block

- Screw outlet end of column **113** onto column outlet capillary (depends on Version: **122**(2.844.0010/2.844.0110), **123** (2.844.0020/2.844.0120) or **124** (2.844.0030/2.844.0130)).

Changing the separation system

If you wish to replace an IC separating column by a column of a different type, proceed as follows:

1 Remove old column

- Switch off high-pressure pump and wait for pressure to drop.
- With column heating: screw off knurled screws **116**, remove cover **117**.
- Screw off the column connection capillaries (both sides) from the column or precolumn.

2 Rinse with eluent

- Place a beaker beneath column inlet capillary **47**/**110**.
- If the new eluent is not miscible with the previous eluent then you must rinse the IC system for approx. 15 min with a solvent in which both the eluents are miscible.
- Rinse the IC system for approx. 15 min with the eluent required for the column that is later to be used (flow rate 1 mL/min).

3 Connect new column to injection valve

- Remove end caps from column **113**.
- Screw inlet end of column **113** (observe flow direction) onto column inlet capillary**47**/**110** or onto the precolumn (see *Section 2.8.1*).

4 Rinse column

- Place beaker beneath the column outlet.
- Set flow rate for new separating column.
- Switch on high-pressure pump and rinse column with eluent for approx. 10 min, then switch off pump.

5 Connect column to detector block

- Screw outlet end of column **113** onto column outlet capillary (depends on Version: **122**(2.844.0010/2.844.0110), **123** (2.844.0020/2.844.0120) or **124** (2.844.0030/2.844.0130)).

4.2.4 Maintenance work at the pump head

In many cases, an unstable baseline (pulsation, flow fluctuations) can be traced to contaminated valves or faulty, leaky piston seals at the high-pressure pump. For cleaning contaminated valves and/or replacement of wear parts such as pistons, piston seals and valves, proceed as follows:

1 Detach pump head

- Switch off pump drive of the IC Pump.
- Disconnect aspirating tubing **82** from aspirating capillary **30** at the pump head **27/54.**
- Unscrew connection capillary **24/52** from the pump head **27/54**.
- Remove the pump head **27/54** by slackening the 4 securing screws on the front of the pump head with the aid of the Allen key 6.2621.030 from the pump housing. The main piston is located at the left (when viewed from the front) and the auxiliary piston is located at the right.

2 Disassemble pump head

- Strip down pump head **27/54**. Main and auxiliary pistons are identical with the following exceptions:
  - The spring **136** of the auxiliary piston (right piston) is more powerful (longer) than that of the main piston (left piston).
  - Inlet and outlet valve are not present in the secondary cylinder.

*To prevent the piston **134** suddenly jumping out of the piston cartridge **137**, the screw **133** must be undone very carefully by hand.*

3 Cleaning/replacement of piston 134

- Pistons contaminated by abrasive particles or deposits are cleaned with scouring powder and rinsed free of any particles with dist. water.
- Relatively badly contaminated or scratched pistons must be replaced (spare part: 6.2824.070 Zircon piston).

4 Replacement of piston seal 140

- To remove damaged piston seals **140** the special tool **144** is used. This is screwed into the seal **140**, which can then be pulled out (see Figure 27 *A*).

*When the special tool **144** is screwed into the piston seal **140** the latter is completely destroyed!*

- To install a new piston seal **140** the special tool **145** is used.
- First the new seal is inserted firmly in the recess of tool **145** by hand (see Figure 27 B). The seal spring must be located on the outside.
- The tool **145** together with the seal is then inserted in the pump head **27/54** and the seal pressed into the pump head recess with the aid of tool **144** (see Figure 27 *C*).

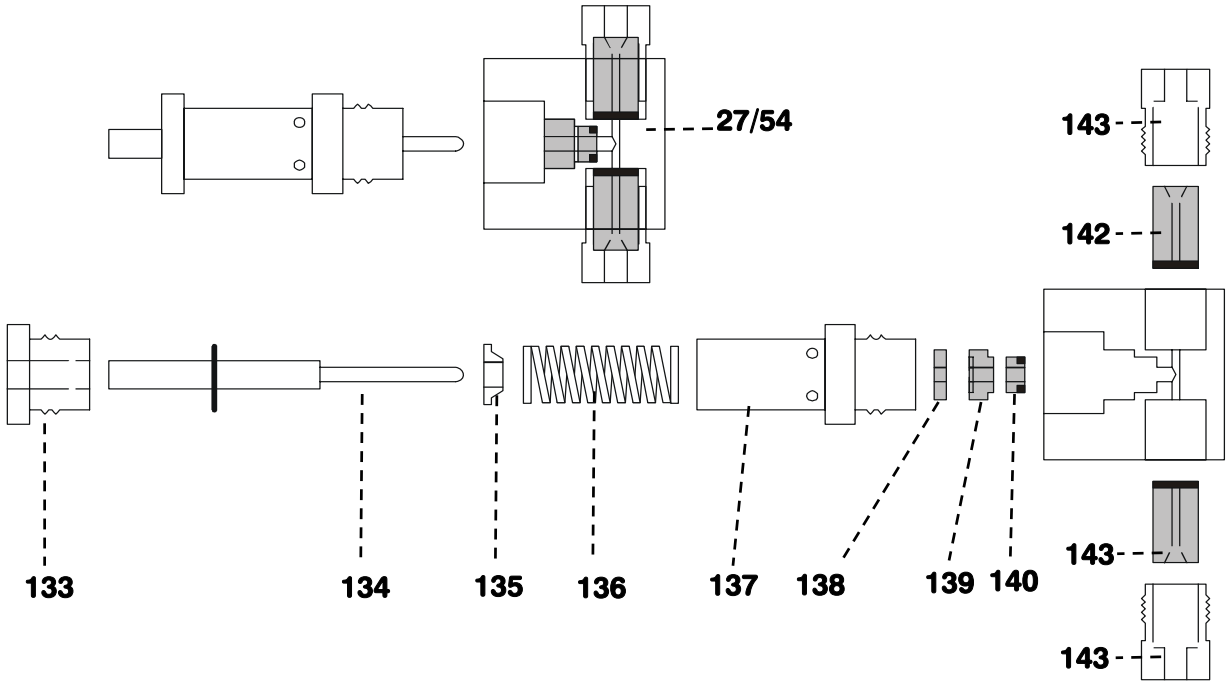


Figure 26: Components of the pump head

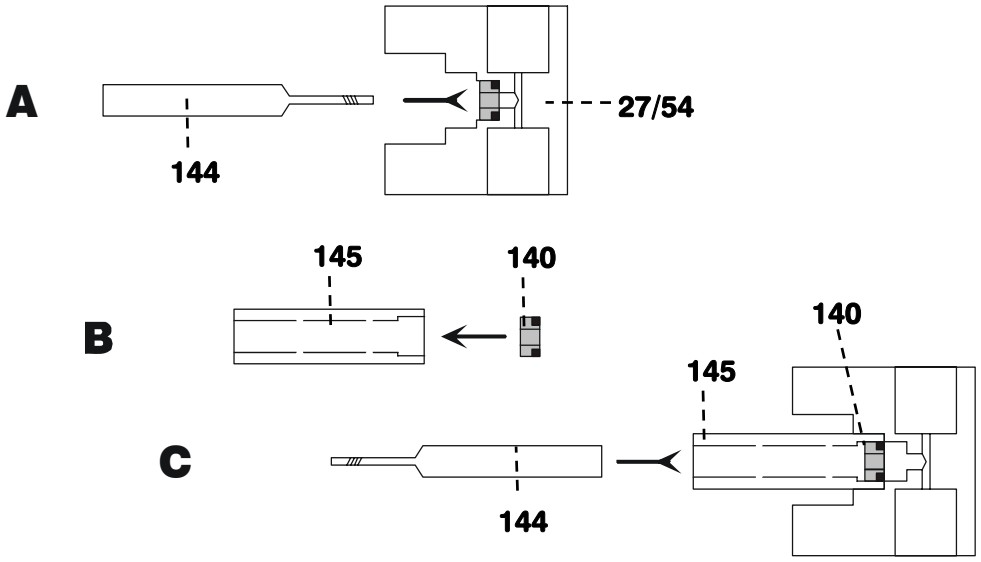


Figure 27: Replacement of the piston seal 140

27/ 54	**Pump head 6.2824.040/6.2824.100**
133	**Screw (3.709.1100)** for piston cartridge **137.**
134	**Zirconium piston (6.2824.070)** with piston shaft
135	**Spring retainer**
136	**Spring (6.2824.050)** for main piston or **Spring (6.2824.060)** for auxiliary piston
137	**Piston cartridge (4.709.0760)**
138	**Piston guide sleeve (4.709.4380)**
139	**Piston guide sleeve (4.709.4370)**
140	**Piston seal (6.2741.020)**
141	**Inlet valve 6.2824.020/6.2824.090**
142	**Outlet valve 6.2824.010/6.2824.080**
143	**Screw holder** for valve
144	**Special tool (6.2617.010)** to remove the piston seal **140**
145	**Special tool (6.2617.010)** to install the piston seal **144**

*The seal surface in the pump head **27/54** must not be damaged (avoid contact with tool)!*

5 Cleaning/replacement of inlet valve 141 and outlet valve 142

- Contaminated or blocked valves are cleaned by rinsing with dist. water, RBS solution or acetone. The rinsing effect can be reinforced by brief treatment in an ultrasonic bath (max. 20 s; if longer the sapphire sphere of the valve can be damaged).
- If this does not have the desired effect, the valves can be disassembled as shown in Figure 28. The valve components are pushed out with the aid of a syringe needle inserted

through the upper opening in the valve housing. The individual components are rinsed with dist. water and/or acetone, and the sapphire sphere cleaned with a paper towel. The valve is then reassembled in accordance with Figure 28. The components of the inlet and outlet valves are identical, they are distinguished only by the positioning of the ceramic holder **151** (see Figure 28).

- Valves that fail to function faultlessly after such cleaning must be replaced.
- In the reinstallation of the inlet valve **141** or the outlet valve **142** on no account must the two outwardly identical valves be interchanged. To determine which valve is which, note that the liquid flows through the pump head from the bottom up. The flow direction of the valves can be checked simply by blowing through the clean valve. Both valves are installed with the black face in the direction of the pump head (see Figure 28).

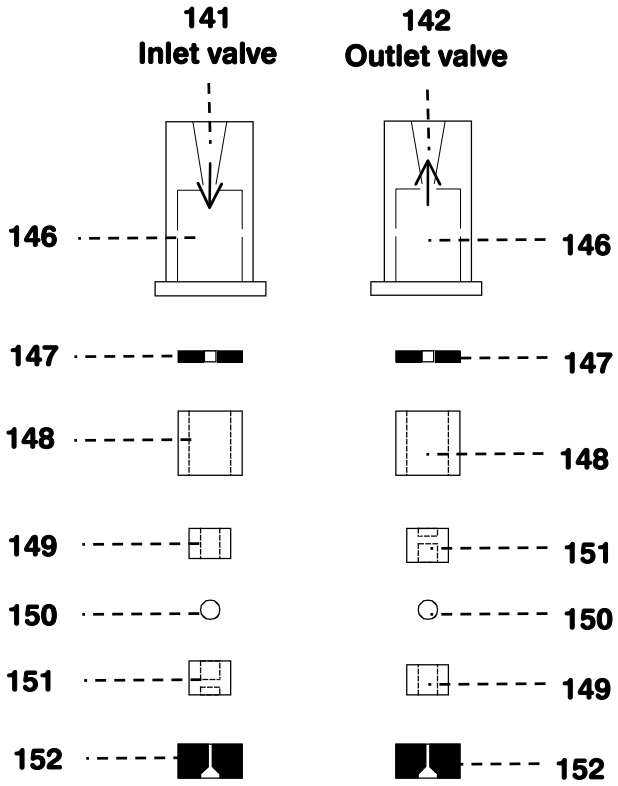
*If by mistake an inlet valve **141** is installed instead of the outlet valve **142**, an extreme pressure buildup occurs within the working cylinder, which is not detected by the pressure transducer and will destroy the piston seal **140**!*

6 Mounting the pump head

- Reassemble the components of the pump head **27/54** as shown in Figure 28. Tighten the screw **133** by hand. First screw in piston cartridge **137** manually until the stop is reached and then use a wrench to turn it through a further 30°. Firmly tighten the two valve screw holders **143** with a wrench.
- Reattach pump head **27/54** to the pump with the help of the 4 fixing screws. Firmly tighten them with the 6.2621.030 Allen key.

To ensure that the pump head is not positioned wrongly, the holes at the rear for the clamping bolts have different depths, i.e. 1 clamping bolt is longer than the rest. The deepest hole must naturally accommodate the longest bolt. If this is not the case, the pump will not function properly.

- Screw connection capillary **30** to pump head **27/54**.
- Connect aspirating tubing **82** to aspirating capillary **30** at the pump head **27/54**.



146	**Valve housing**
147	**Sealing ring** (black)
148	**Sleeve**
149	**Sapphire sleeve** The bright side must point towards the sapphire sphere.
150	**Sapphire sphere**
151	**Ceramic holder for sapphire sphere** The large recess must point in the direction of the sapphire sphere
152	**Seal** The larger opening must point outwards

Figure 28: Components of inlet valve 141 and outlet valve 142

4.2.5 Replacing the pump tubing

The pump tubings used by the peristaltic pump are consumable material with a limited lifetime and should be exchanged at regular intervals (approx. every 4 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 2.10.2*. If the pump is to remain switched off for a lengthy period of time the tubing cartridges **96** should be raised completely by loosening the snap-action lever **98** on the right-hand side (the set contact pressure remains unchanged).

As the pump is always operated on the same side the 6.1826.110 Pump tubings supplied can be used on both sides. To exchange a pump tubing proceed as follows:

1 Remove old pump tubing

- Press contact pressure lever **97** on the tubing cartridge **96** down as far as it will go.
- Release tubing cartridge **96** from **50** by pressing down snap-action lever **98** and remove from mounting pin **40**.
- Remove old pump tubing **94**.

2 Insert new pump tubing

- Insert the new pump tubing **94** in the tubing cartridge **96** as shown in Figure 17. The orange-yellow stopper **95** must click into the corresponding holder on the left-hand side of the tubing cartridge.
- Place the tubing cartridge **96** on mounting pin **40** and press down on the right-hand side until snap-action lever **98** clicks into position on holding clamp **50**. Take care that no kinks are formed in the pump tubing.

3 Set contact pressure

- Switch on peristaltic pump.
- Press contact pressure lever **97** 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.
- Switch off peristaltic pump.

4.2.6 Replacing the UV lamp

Proceed as follows to replace the UV lamp:

The UV lamp becomes hot when used for a long time! Allow it to cool down before you start to replace it.

Avoid contact with the surface of the lamp! *Residues reduce the light transmittance and may also be burned into the glass and cause permanent damage.*

If it becomes dirty the lamp surface should be cleaned with alcohol before it is used again.

1 Insert lamp

- Insert UV lamp **153** into the "Opening for UV lamp" **155** at the bottom of lamp cooling housing **9**.

2 Screw on fastening ring

- Screw down attachment ring **154**. The attachment ring forms part of the 844.

3 Connect cable

- Plug "UV lamp connection cable" **11** into " UV lamp connection" **12** of the 844 UV/VIS Compact IC.

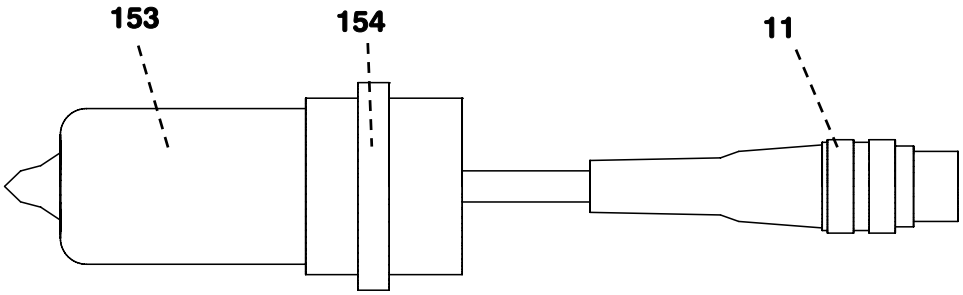


Figure 29: UV lamp (deuterium)

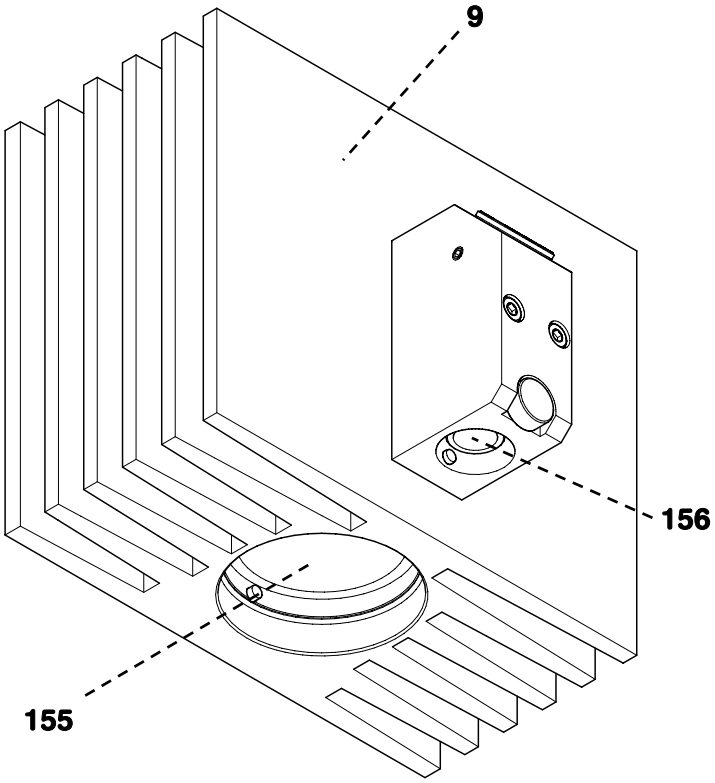


Figure 30: Lamp connections (at the back of the 844 UV/VIS Compact IC)

9 Lamp cooling housing	**155** Opening for UV lamp
11 UV lamp connection cable	**156** Opening for VIS lamp
153 UV lamp	
154 UV lamp attachment ring	

Replacing the VIS lamp (halogen) is described on the 8.108.1073 leaflet accompanying the VIS lamp.

4.3 Faults and malfunctions

4.3.1 Error messages

If any type of malfunction occurs during operation of the 844 UV/VIS Compact IC, this is shown by error messages in the PC program, which appear either in an error window or in the **SYSTEM STATE** window.

Follow the instructions listed in the **Error window** and close this window with **<OK>**.

You will find further details of the error messages of the **SYSTEM STATE** window, their possible causes and the procedure for rectifying them in the *Software Instructions for Use «IC Net 2.3» Section 4.5*.

4.3.2 Malfunctions and their rectification

If difficulties appear with The 844 UV/VIS Compact IC during analyses, their causes are best investigated in the order **separating column → high-pressure pump → eluent → connections**. Several of The malfunctions which may appear are listed in the following table with details of possible causes and countermeasures.

Malfunction	*Cause*	*Rectification*
Baseline with high noise level, pulsation	• Contaminated pump valves • Defective piston seals	• Clean the valves (see *Section 4.2.4*) • Replace the piston seals (see *Section 4.2.4*)
Drift of the baseline	• Thermal equilibrium not yet reached • Leak in system • Evaporation of organic solvent in eluent	• Condition system with heating switched on • Check connections and make leakproof • Ensure better closure of eluent supply vessel
Considerable pressure drop	• Leak in system	• Check connections and make leakproof
Considerable pressure rise	• Contamination of the filter in the 6.2821.120 Filter unit PEEK • Blockage of the precolumn • Change of column packing by injection of contaminated samples	• Replace the 6.2821.130 Filter (see *Section 2.3.5*) • Change precolumn (see *Section 4.2.3*) • Regenerate column (see *Section 4.1.1*) or replace column (see *Section 4.2.3*) *Note:* *Samples should always be microfiltered.*
Chromatograms with poor resolution, change in the retention times	• Deterioration in separation efficiency of the IC column	• Regenerate column (see *Section 4.1.1*) or replace column

Malfunction	*Cause*	*Rectification*
Extreme peak broadening, splitting (double peaks)	• Dead volume at the column ends	• Check the connections (use PEEK capillaries with 0.25 mm i.d. between injection valve and detector block) • Turn separation column (if allowed), or replace it
No feed of reagent for the post column reactor	• Contact pressure too low • Leak in system • Defective pump tubing • Contamination of the filter in the 6.2821.120 Filter unit PEEK	• Adjust contact pressure (see *Section 2.10.2*) • Check connections and make leakproof • Replace pump tubing (see *Section 4.2.5*) • Replace the 6.2821.130 Filter (see *Section 2.3.5*)
Bleeping of the gas sensor	• Gas in the instrument	• Turn off instrument • If solvent leaked into the device, remove it.

4.4 Quality Management and validation with Metrohm

Quality Management

Metrohm offers you comprehensive support in implementing quality management measures for instruments and software. You can find information on this in the brochure available from your local Metrohm agent **«Quality Management with Metrohm»**.

Validation

Please contact your local Metrohm agent for support in validating instruments and software. Here you can also obtain validation documentation to provide help for carrying out the **Installation Qualification** (IQ = Installation Qualification) and the **Operational** (OQ = Operational Qualification). IQ and OQ are also offered as a service by the Metrohm agents. In addition, various application bulletins are also available on the subject, which also contain **Standard Operating Procedures** (SOP = Standard Operating Procedure) for testing analytical measuring instruments for reproducibility and correctness.

Maintenance

Electronic and mechanical functional groups in Metrohm instruments can and should be checked as part of regular maintenance by specialist personnel from Metrohm. Please ask your local Metrohm agent regarding the precise terms and conditions involved in concluding a corresponding maintenance agreement.

*You can find information on the subjects of quality management, validation and maintenance as well as an overview of the documents currently available at http://www.metrohm.com under **Support**/**Quality Management**.*

5 Appendix

5.1 Technical data

Unless otherwise specified, the published data comprises typical values for the 844 UV/VIS Compact IC at an ambient temperature of 25 °C.

5.1.1 UV/VIS Detector

Measuring range

Absorption	-2.0 ... 2.0 AU
Number of channels	3 absorption channels + 1 ratio channel
Resolution	2.5 * 10-7 AU
Noise	2.5 * 10-5 AU (data rate 1/s))

Drift

at reference conditions	5 * 10-4 AU/h

Wavelength range

Wavelength range λ	190...900 nm
Bunching $\Delta\lambda$	1...limit nm (limit is 2 times the difference between the wavelength of the measuring channel and the nearer wavelength border (190 resp. 900 nm). $\Delta\lambda$ is always odd.)
Accuracy absolute	+/- 3 nm
Stability	+/- 1 nm
Optical resolution	5 nm

Measuring interval

Data rate for each channel	0.5 ... 20 samples/sec

Analog output

Voltage range	-1.0 ... 1.0 V
Resolution	30 µV
Noise	<30 µV

Lamps

UV lamp

Type	D^2 (Deuterium)
Power consumption	approx. 20 ... 30 W
Lifetime	approx. 1000 h

VIS lamp

Type	Halogen
Power consumption	approx. 5 W
Lifetime	approx. 10'000 h

5.1.2 Injection valve

Actuator switching duration	100 … 150 ms
Pressure resistance	35 MPa (350 bar)

5.1.3 High-pressure pump

Type	Serial dual piston pump with two valves
Pump capacity	
Flow range	0.20...2.5 mL/min
Maximum error	< ± 2 % of set value
Flow constancy	< 0.5 % of set value
Reproducibility of eluent flow	typ. better than ± 0.1 %
Pressure measurement	
Pressure range	at flow 0.2 ... 1.5 mL/min: 0 ... 35.0 MPa (0 ... 350 bar) at flow 1.5 ... 2.5 mL/min: 0 ... 25.0 MPa (0 ...250 bar)
Residual pulsation	< 10 % (at 1 mL/min water and 10 MPa pressure, without pulsation dampener)
Measurement principle	Piezoresistive measurement Response time: 3 ms Measurement volume: approx. 50 µL
Maximum error	± 3 % of set value
Resolution	0.1 MPa
Sampling rate	1 measurement/piston stroke (pump running) 1 measurement/s (pump not running)
Safety shutdown	
Function	Automatic shutdown when upper and lower pressure limits violated
Maximum pressure limit	adjustable between 0.1...35.0 MPa (1...350 bar) Response time: 1 pump cycle
Minimum pressure limit	adjustable between 0.1 ... 35.0 MPa (1...350 bar), inactive at 0 MPa Response time: 5 pump cycles
Pump head	
Pump head volumes	Main piston: 40 µL Priming piston: 20 µL
Pump displacement volumes	Main piston: 28.5 µL Priming piston: 14.25 µL
Length of stroke	Main piston: 3.6 mm Priming piston: 1.8 mm

5.1.4 Peristaltic pump

Type	2 channel peristaltic pump
Pump capacity	
Rotational speed	20 U/min at 50 Hz 24 U/min at 60 Hz
Flow range	0.4…0.5 mL/min with 6.1826.110 Pump tubing
Maximum error	± 5 %
Maximum pressure	0.4 MPa (4 bar)
Pumpable liquids	Clear liquids with no solid contents
Pump tubing material	PVC

5.1.5 Leak detector

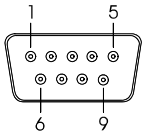
Type	Detector with 2 electrodes approx. 1 mm above base of interior
Response level	Resistance < 1 MΩ (for deion. water)

5.1.6 Gas Sensor

Type	high sensitivity elektrochemical sensor
Response level	50...5000 ppm

5.1.7 RS232 interface

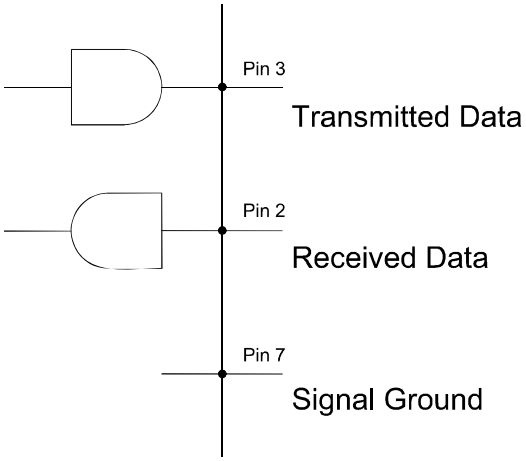
Connector Dsub 9 pin (male)



Function TxD and RxD signal for connection with software handshake

Default settings 115200 baud, 8 bit, 1 stop bit, no parity, XON/XOFF

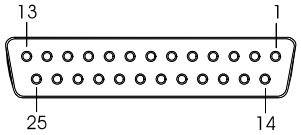
Pin assignment



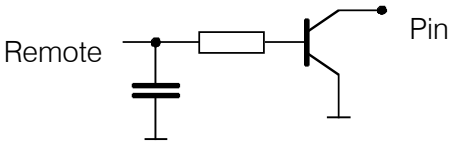
5.1.8 Remote interface

Connector

Dsub 25 pin (female)



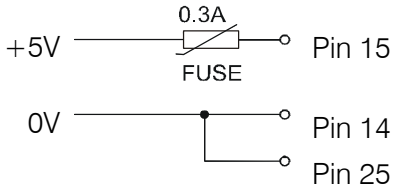
Circuit diagram for output lines 1…8



Assignment of output lines 1…8

Remote 1	Pin	18
Remote 2	Pin	4
Remote 3	Pin	3
Remote 4	Pin	1
Remote 5	Pin	2
Remote 6	Pin	16
Remote 7	Pin	17
Remote 8	Pin	5

Potentials



5.1.9 Mains connection

Voltage

115 V: 100...120 V ± 10 %
230 V: 220...240 V ± 10 %

Frequency

50...60 Hz

Power consumption

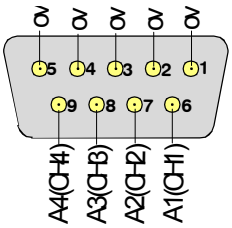
170 VA

Fuse

5 mm dia., 20 mm length
100…120 V: 1.6 A (slow-blow)
220…240 V: 0.8 A (slow-blow)

5.1.10 Analog output

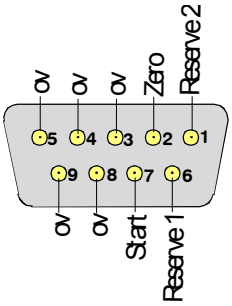
Connector Dsub 9 pin (female)



Uout = -1V...+1V

5.1.11 Control input

Connector Dsub 9 pin (female)



Activation by switch contact to 0V

5.1.12 Safety specifications

Construction/testing According to EN/IEC/UL 61010-1,
CSA-C22.2 No. 61010-1
protection class 1, degree of protection IP40

Safety directions The Instructions for Use include information and warnings which must be heeded by the user to assure safe operation of the instrument.

5.1.13 Electromagnetic compatibility (EMC)

Emitted interference Standards met::
-IEC/EN 61326
-EN 55022
-CISPR 22
-IEC/EN 61000-3-2
-IEC/EN 61000-3-3

Immunity to interference	Standards met: - EN/IEC 61326 - EN/IEC 61000-4-2 - EN/IEC 61000-4-3 - EN/IEC 61000-4-4 - EN/IEC 61000-4-5 - EN/IEC 61000-4-6 - EN/IEC 61000-4-11 - EN/IEC 61000-4-14 - NAMUR

5.1.14 Temperature control column heating

Temperature range	+10°C...75°C, controllable in 0.1 °C steps. Only heating! The temperature cannot be controlled to a temperature below the ambient temperature.
Accuracy	± 0.5 °C
Stability	better than 0.05 °C
Scanning time	250 ms

5.1.15 Ambient temperature

Nominal operating range	+5…+45°C (at 20…80 % atmospheric humidity)
Storage	–20…+70°C
Transport	–40…+70°C

5.1.16 Housing

Material of cover	Aluminium
Material of base	Steel, enameled
Material of door	Polyurethane rigid foam (PUR) with fire protection for fire class UL94VO, CFC-free
Width	259 mm
Height	381 mm
Depth	512 mm
Weight	ca. 25 kg

5.2 Standard equipment

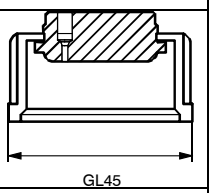
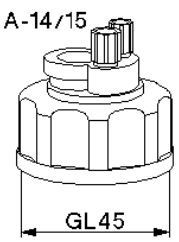
Subject to changes !
All dimensions are given in mm.

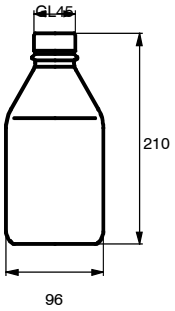
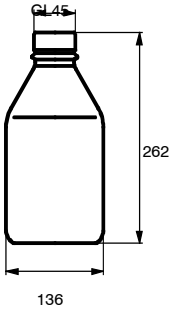
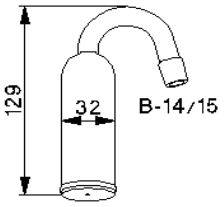
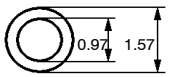
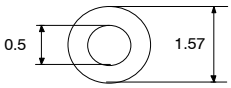
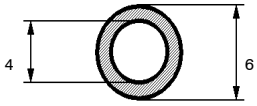
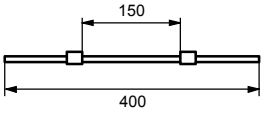
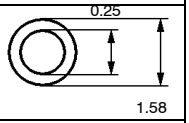
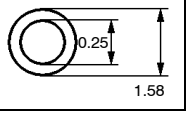
5.2.1 PEEK versions

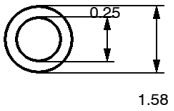
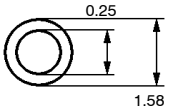
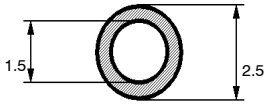
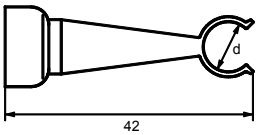
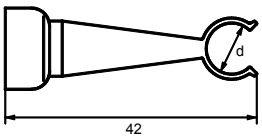
The following PEEK versions of the 844 UV/VIS Compact IC are available:

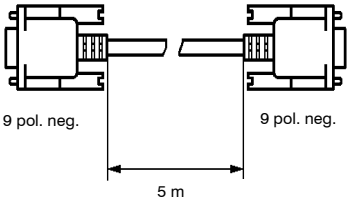
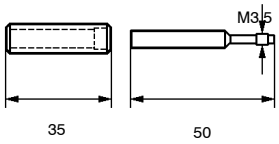
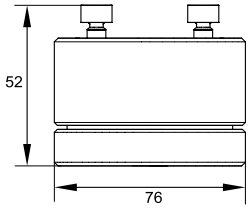
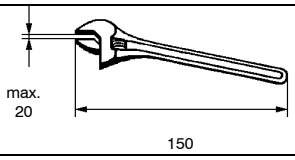
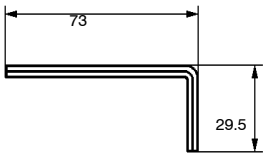
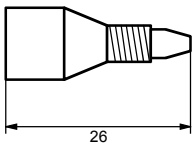
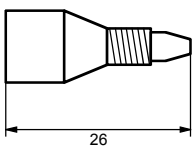
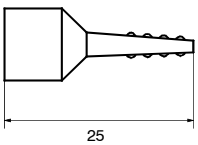
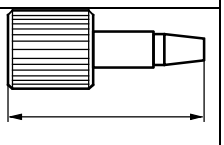
- **2.844.0010** UV/VIS Compact IC
- **2.844.0020** UV/VIS Compact IC with post column reactor
- **2.844.0110** UV/VIS Compact IC with column heating
- **2.844.0120** UV/VIS Compact IC with post column reactor and column heating

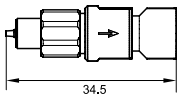
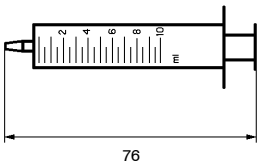
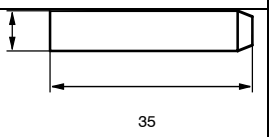
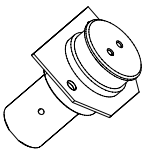
These instruments include the following parts:

Number				*Order no.*	*Description*
2.844.0010	**2.844.0020**	**2.844.0110**	**2.844.0120**		
-	-	1	1	**1.820.0500**	**IC Column heating**
1	-	-	-	**1.844.0010**	**UV/VIS Compact IC**
-	1	-	-	**1.844.0020**	**UV/VIS Compact IC PCR**
-	-	1	-	**1.844.0110**	**UV/VIS Compact IC Thermo**
-	-	-	1	**1.844.0120**	**UV/VIS Compact IC Thermo PCR**
-	1	-	1	**6.1602.150**	**Bottle attachment GL45** for 6.1608.023 Amber glass bottle (1 L) 
1	1	1	1	**6.1602.160**	**Bottle attachment GL45** for 6.1608.070 Clear glass bottle (2 L), incl. the following accessories: 1 × 6.1446.040 Thread stopper M6 1 × 6.1602.105 Bottle attachment GL 45 1 × 4.420.0311 Tubing nipple M6 1 × 4.420.4300 Tubing nipple M8 2 × E.301.0021 O-ring 

Number				Order no.	Description
2.844.0010	2.844.0020	2.844.0110	2.844.0120		
-	1	-	1	6.1608.020	**Clear glass bottle 1 L** Bottle for reagent, with GL45 thread 
1	1	1	1	6.1608.070	**Clear glass bottle 2 L** Eluent bottle, with GL45 thread 
1	1	1	1	6.1609.000	**CO_2 Absorber tube** incl. 6.2701.020 Stopper For 6.1602.160 Bottle attachment. 
-	1	-	1	6.1803.020	**PTFE capillary** Length = 5 m 
-	1	-	1	6.1803.050	**PTFE capillary** Length = 0.3 m 
1	1	1	1	6.1816.060	**Silicone tubing** Drain tube for inner compartment and bottle rack, length = 1 m 
-	2	-	2	6.1826.110	**Pump tubing** made of PVC with 2 firmly attached orange-yellow stoppers; i.d. = 0.49 mm 
1	1	1	1	6.1831.010	**PEEK capillary** Length = 3 m 
-	1	1	2	6.1831.100	**PEEK capillary** For column connection with column heating 

Number				Order no.	Description
2.844.0010	2.844.0020	2.844.0110	2.844.0120		
					Length = 1 m
2	3	-	1	6.1831.110	**PEEK capillary** For column connection without column heating and post column reactor connection Length = 0.3 m 
-	-	1	1	6.1831.120	**PEEK capillary** For column connection with column heating Length = 0.45 m 
1	1	1	1	6.1834.010	**Aspirating tubing** made of PTFE, with connector for 6.2821.090 aspirating filter Length = 2.5 m For the connection high-pressure pump – eluent bottle 
1	1	1	1	6.2023.020	**SGJ clip** 
1	1	1	1	6.2027.030	**Column holder** Diameter d = 8.5 mm 
1	1	1	1	6.2027.040	**Column holder** Diameter d = 11.3 mm 
-	1	-	1	6.2057.050	**PCR holder** Holder for post column reactor in 844.
-	-	1	1	6.2108.140	**Cable for column heating** Cable for connecting the column heating in 844.
1	1	1	1	6.2122.0X0	**Mains cable** to customer's specifications: Cable socket — Cable connector 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

Number				Order no.	Description
2.844.0010	2.844.0020	2.844.0110	2.844.0120		
1	1	1	1	6.2134.100	**Connecting cable** Connecting cable 844 UV/VIS Compact IC (RS232) – PC 
1	1	1	1	6.2617.010	**Special tool** For removing the piston seal of the pump head 
1	1	1	1	6.2620.150	**Pulsation dampener MF** Metal-free pulsation dampener to reduce pulsation and prolong the life of separating columns. 
1	1	1	1	6.2621.000	**Adjustable spanner** 
1	1	1	1	6.2621.030	**Hexagon key 4 mm** For mounting the pump head of the high-pressure pump. 
-	1	-	2	6.2744.010	**PEEK compression fitting** For the connection of PEEK capillaries, set of 5 
-	-	1	-	6.2744.014	**PEEK compression fitting** For the connection of PEEK capillaries, set of 2 
-	1	-	1	6.2744.030	**PEEK coupling** Connection between PEEK compression fitting and Pump tubing; Set of 4 
1	1	1	1	6.2744.070	**PEEK compression fitting short** For connecting PEEK capillaries in tight situations, e.g. in column heating, 

Number				Order no.	Description
2.844.0010	2.844.0020	2.844.0110	2.844.0120		
					Set of 5 pieces
-	1	-	1	6.2744.180	**PEEK coupling with filter and tubing security device** 
1	1	1	1	6.2816.020	**Syringe** made of PP, volume = 10 mL; for manual filling of the sample loop 
1	1	1	1	6.2821.090	**Aspirating filter** Pore dimension 20 µm For 6.1834.010 Aspirating tubing. Set of 5 
1	1	1	1	6.2821.130	**Filter** Spare filter. set of 10
-	1	-	1	6.2836.000	**Post column reactor** For post column derivatization with UV/VIS detection.
1	1	1	1	6.2839.130	**Flow-through cell PEEK 10 mm** Measuring cell for UV/VIS detection with 10 mm pathlength. 
1	1	1	1	6.6034.033	**Software CD «IC Net 2.3»**
1	1	1	1	8.102.0033	**Software Manual** (English) for PC program «IC Net 2.3»
1	1	1	1	8.102.1013	**Administrator manual** (English) for PC program «IC Cap 2.2»
1	1	1	1	8.102.1119	**User manual** (multilingual) for PC program «IC Cap 2.2»
1	-	-	1	8.110.8213	**Software Manual** (English) for PC program «Autodatabase 1.0»
1	-	-	1	8.110.8293	**Compliance white paper** (English) for PC program «IC Net 2.3»
1	1	1	1	8.792.5003	**Metrohm Monograph «Practical Ion Chromatography»** (English)

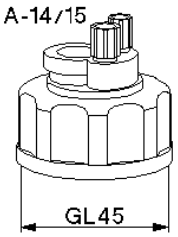
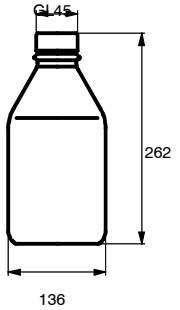
Number				Order no.	Description
2.844.0010	2.844.0020	2.844.0110	2.844.0120		
1	1	1	1	**8.844.1053**	**Manual** (English) for 844 UV/VIS Compact IC

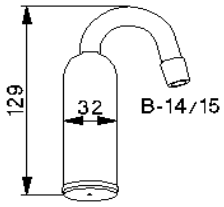
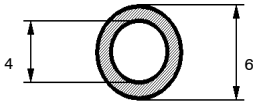
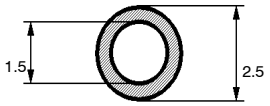
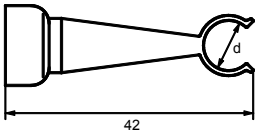
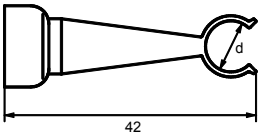
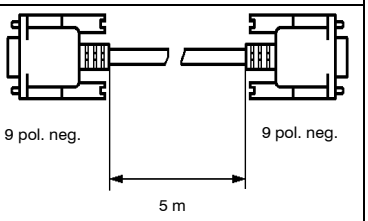
5.2.2 Steel versions

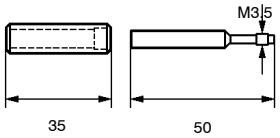
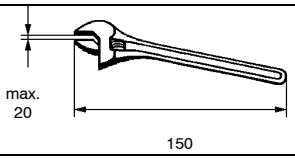
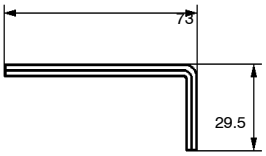
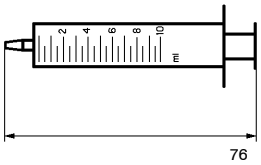
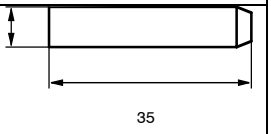
The following Steel versions of the 844 UV/VIS Compact IC are available:

- **2.844.0030 UV/VIS Compact IC: Steel**
- **2.844.0130 UV/VIS Compact IC with Column heating: Steel**

These instruments include the following parts:

Number		Order no.	Description
2.844.0030	2.844.0130		
-	1	**1.820.0500**	**IC Column heating**
1	-	**1.844.0030**	**UV/VIS Compact IC – SST**
-	1	**1.844.0130**	**UV/VIS Compact IC with Column heating – SST**
1	1	**6.1602.160**	**Bottle attachment GL45** for 6.1608.070 Clear glass bottle (2 L), incl. the following accessories: 1 × 6.1446.040 Thread stopper M6 1 × 6.1602.105 Bottle attachment GL 45 1 × 4.420.0311 Tubing nipple M6 1 × 4.420.4300 Tubing nipple M8 2 × E.301.0021 O-ring 
1	1	**6.1608.070**	**Clear glass bottle 2 L** Eluent bottle, with GL45 thread 

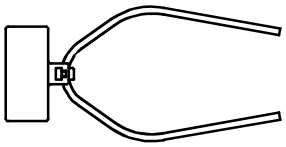
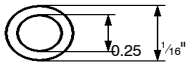
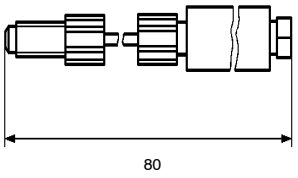
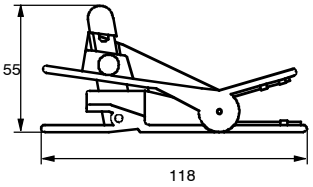
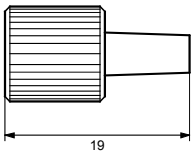
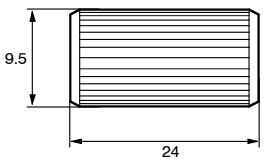
Number		Order no.	Description
2.844.0030	2.844.0130		
1	1	6.1609.000	**CO_2 Absorber tube** incl. 6.2701.020 Stopper For 6.1602.160 Bottle attachment. 
1	1	6.1816.060	**Silicone tubing** Drain tube for inner compartment and bottle rack, length = 1 m 
1	1	6.1834.010	**Aspirating tubing** made of PTFE, with connector for 6.2821.090 aspirating filter Length = 2.5 m For the connection high-pressure pump – eluent bottle 
1	1	6.2023.020	**SGJ clip** 
1	1	6.2027.030	**Column holder** Diameter d = 8.5 mm 
1	1	6.2027.040	**Column holder** Diameter d = 11.3 mm 
-	1	6.2108.140	**Cable for column heating** Cable for connecting the column heating in 844.
1	1	6.2122.0X0	**Mains cable** to customer's specifications: Cable socket / Cable connector 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	1	6.2134.100	**Connecting cable** Connecting cable 844 UV/VIS Compact IC (RS232) – PC 

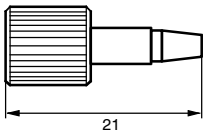
Number		Order no.	Description
2.844.0030	2.844.0130		
1	1	6.2617.010	**Special tool** For removing the piston seal of the pump head 
1	1	6.2620.000	**Pressure screws (metal)** 
-	1	6.2620.160	**Steel-Capillary 1/32 inch / 0.25 mm 30 cm**
1	2	6.2620.170	**Steel-Capillary 1/32 inch/0.25 mm 1 m**
1	1	6.2621.000	**Adjustable spanner** 
1	1	6.2621.030	**Hexagon key 4 mm** For mounting the pump head of the high-pressure pump. 
1	1	6.2621.050	**Wrench 1/4 in.** 
1	1	6.2744.270	**Ferrule PEEK 1/32 inch 5 Pieces** 
1	1	6.2816.020	**Syringe** made of PP, volume = 10 mL; for manual filling of the sample loop 
1	1	6.2821.090	**Aspirating filter** Pore dimension 20 µm For 6.1834.010 Aspirating tubing. Set of 5 

Number		Order no.	Description
2.844.0030	2.844.0130		
1	1	**6.6034.033**	**Software CD «IC Net 2.3»**
1	1	**8.102.0033**	**Software Manual** (English) for PC program «IC Net 2.3»
1	1	**8.102.1013**	**Administrator manual** (English) for PC program «IC Cap 2.2»
1	1	**8.102.1119**	**User manual** (multilingual) for PC program «IC Cap 2.2»
1	-	**8.110.8213**	**Software Manual** (English) for PC program «Autodatabase 1.0»
1	-	**8.110.8293**	**Compliance white paper** (English) for PC program «IC Net 2.3»
1	1	**8.792.5003**	**Metrohm Monograph «Practical Ion Chromatography»** (English)
1	1	**8.844.1053**	**Manual** (English) for 844 UV/VIS Compact IC

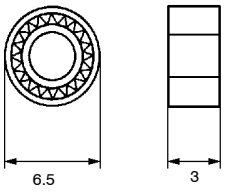
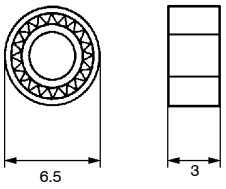
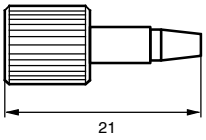
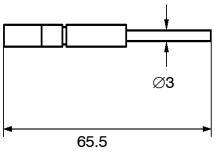
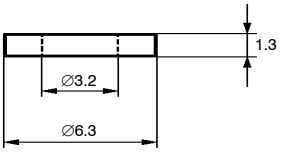
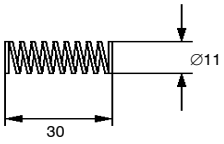
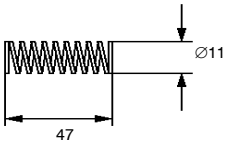
5.3 Optional accessories

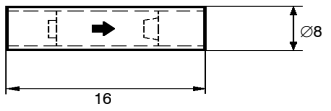
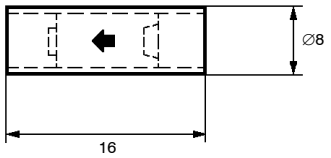
5.3.1 General accessories

Order no.	Description
6.1825.XXX	**Sample loop, made of PEEK** For injection valve; incl. two 6.2744.010 PEEK compression fittings 6.1825.210: Volume = 20 µL 6.1825.220: Volume = 100 µL 6.1825.230: Volume = 10 µL 
6.1831.010	**PEEK capillary** Length = 3 m 
6.2620.040	**Coupling 1/16" – 1/4"** Connector for plastic separating columns with 1/4"-28 thread 
6.2621.080	**Capillary cutter for plastic capillaries** with 5 spare blades 
6.2621.040	**Capillary Cutting Pincers** For steel capillaries. 
6.2744.020	**Coupling 1/16" – Luer** Coupling for connection of a 6.1803.000 PTFE capillary to connection of the 844 UV/VIS Compact IC when a Sample Changer is used 
6.2744.040	**PEEK coupling** For connection of 1/16" capillaries 

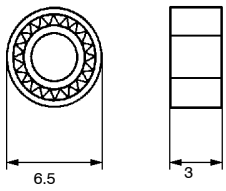
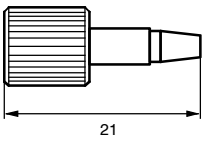
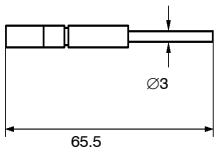
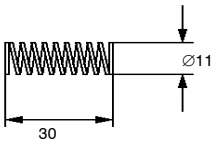
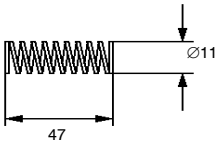
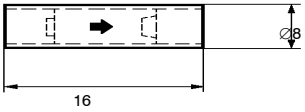
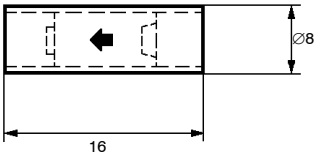
Order no.	Description
6.2744.070	**PEEK compression fitting short** Spare part for 6.2824.100 Pump head Set of 5 
6.2821.130	**Filter for Filter unit PEEK** Spare part for 6.2821.120 Filter unit PEEK. Set of 10

5.3.2 High-pressure pump

Order no.	Description
6.2824.100	**Pump head (metal-free)** Complete, with fixations screws
6.2741.000	**Piston seal** Spare part for 6.2824.100 Pump head 
6.2741.020	**PE piston seal** 
6.2744.070	**PEEK compression fitting short** Spare part for 6.2824.100 Pump head Set of 5 
6.2824.070	**Zircon piston** Spare part for 6.2824.100 Pump head 
6.2824.030	**Sapphire supporting ring** Spare part for 6.2824.100 Pump head 
6.2824.050	**Spring for main piston** Spare part for 6.2824.100 Pump head 
6.2824.060	**Spring for auxiliary piston** Spare part for 6.2824.100 Pump head 

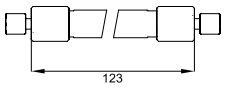
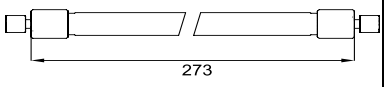
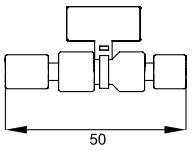
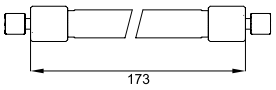
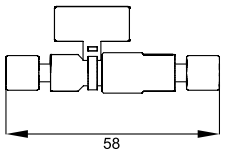
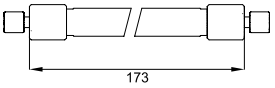
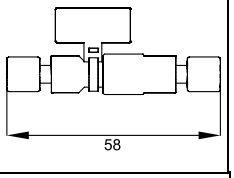
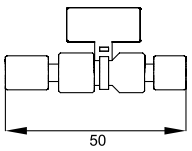
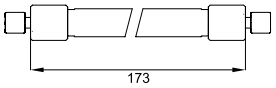
Order no.	Description
6.2824.080	**Outlet valve (metal-free)** Spare part for 6.2824.100 Pump head 
6.2824.090	**Inlet valve (metal-free)** Spare part for 6.2824.100 Pump head 

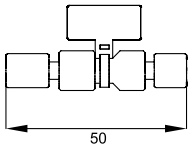
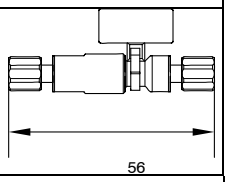
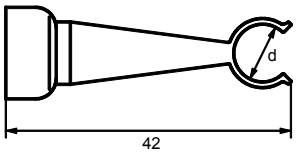
5.3.3 High-pressure pump Steel

Order no.	Description
6.2824.040	**Pump head (steel)** Complete, with attachment screws.
6.2741.020	**Piston seal** 
6.2744.070	**Pressure screw short** Spare part for pump head 6.2824.100 Set of 5 pcs. 
6.2824.070	**Zirconium oxide piston** Spare part for 6.2824.100 
6.2824.050	**Spring for main piston** Spare part for Pump head 6.2824.100 
6.2824.060	**Spring for auxiliary piston** Spare part for Pump head 6.2824.100 
6.2824.010	**Outlet valve (steel** Spare part for Pump head 6.2824.100 
6.2824.020	**Inlet valve (steel)** Spare part for Pump head 6.2824.100 

5.3.4 Separating columns and precolumns

This is a selection of standard columns from our comprehensive range of columns. Our complete range of columns can be found on the Internet under http://www.metrohm.com or request our free-of-charge column catalog.

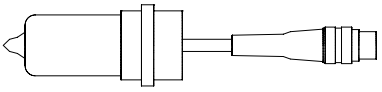
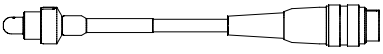
Order no.	*Description*	
6.1006.120	**Metrosep Anion Dual 3** Anion column for use with and without chemical suppression. Column dimensions: 100 × 4.0 mm	
6.1006.430	**Metrosep A Supp 4 - 250** Robust anion column for use with chemical suppression. Column dimensions: 250 × 4.0 mm	
6.1006.500	**Metrosep A SUPP 4/5 Guard (on-column)** Guard column for A SUPP 4 and A SUPP 5 columns. Column dimensions: 5.0 × 4.0 mm	
6.1006.520	**Metrosep A Supp 5 - 150** Anion column for use with chemical suppression. For standard applications. Column dimensions: 150 × 4.0 mm	
6.1006.540	**Metrosep A Supp 4/5 S-Guard** Separate guard column for A SUPP 4 and A SUPP 5 columns. Column dimensions: 5.0 × 4.0 mm	
6.1030.420	**Metrosep A Supp 15 – 150** Anion column for standard applications, for use with chemical suppression.. Column dimensions: 150 x 4.0 mm	
6.1030.500	**Metrosep A Supp 15 Guard 4 mm** Guard column for A SUPP 15 columns. Column dimensions: 5.0 × 4.0 mm	
6.1010.200	**Metrosep C 2 Guard (on-column)** For protecting Metrosep cation columns. Column dimensions: 5.0 × 4.0 mm	
6.1010.220	**Cation column Metrosep C 2 - 150** Cation column for determining monovalent and divalent cations. PEEK column. Column dimensions: 150 × 4.0 mm	

Order no.	Description
6.1010.240	**Metrosep C2 S-Guard** Separate guard column protecting Metrosep cation columns. Column dimensions: 5.0 × 4.0 mm 
6.1011.020	**Metrosep RP Guard** General guard column. For Metrosep Anion Dual 2 and Dual 3 in particular. 
6.1008.100	**Prontosil 120-5-C18 AQ, 150 mm** Reversed phase column for the separation of organic components Column dimensions: 150 × 4.0 mm
6.1008.110	**Prontosil 120-5-C18 AQ Guard** The ProntoSil 120-5-C18 AQ-Guard is used to protect the ProntoSil 120-5-C18 AQ column from particles and bacteria. Column dimensions: 14 x 4.0 mm
6.1011.120	**Spare filter for RP Guard** 10 pieces
6.2027.050	**Column holder** Diameter d = 15.0 mm 

5.3.5 Communication

Order no.	Description
2.145.0320	**Expansion Module USB - 4xDB9** (from Inside Out Networks) Converter USB to 4x serial RS 232 (COM). For the connection of 4 additional devices to the USB-Port of the PC.

5.3.6 Lamps

Order no.	Description
6.2804.060	**Deuterium lamp (UV) for 844** 
6.2804.050	**Halogen lamp (VIS) for 844** 

5.4 Warranty and Conformity

5.4.1 Warranty (guarantee)

Metrohm guarantees that the deliveries and services it provides are free from material, design or manufacturing errors. The warranty period is 36 months from the day of delivery; for day and night operation it is 18 months. The warranty remains valid on condition that the service is provided by an authorized Metrohm service organization.

Glass breakage is excluded from the warranty for electrodes and other glassware. The warranty for the accuracy corresponds to the technical specifications given in this manual. For components from third parties that make up a considerable part of our instrument, the manufacturer's warranty provisions apply. Warranty claims cannot be pursued if the Customer has not complied with the obligations to make payment on time.

During the warranty period Metrohm undertakes, at its own choice, to either repair at its own premises, free of charge, any instruments that can be shown to be faulty or to replace them. Transport costs are to the Customer's account.

Faults arising from circumstances that are not the responsibility of Metrohm, such as improper storage or improper use, etc. are expressly excluded from the warranty.

5.4.2 Declaration of Conformity

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.

Metrohm
Ion analysis
CH-9101 Herisau, Switzerland
Tel. +41 71 353 85 85
Fax +41 71 353 89 01
www.metrohm.com

Name of commodity	**844 UV/VIS Compact IC**
Name of manufacturer	Metrohm Ltd., Herisau, Switzerland

Description The 844 UV/VIS Compact IC is an instrument for ion chromatography analysis with spectroscopic detection..

This instrument has been built and has undergone final type testing according to the standards:

Electromagnetic compatibility: Emission
EN/IEC 61326, EN 55022 / CISPR 22

Electromagnetic compatibility: Immunity
EN/IEC 61326, EN/IEC 61000-4-2, EN/IEC 61000-4-3, EN/IEC 61000-4-4, EN/IEC 61000-4-5, EN/IEC 61000-4-6, EN/IEC 61000-4-8, EN/IEC 61000-4-11, EN/IEC 61000-4-14, Namur

Safety specifications
EN/IEC/UL 61010-1, EN/IEC 61010-2-081, CSA-C22.2 No. 61010-1

It has also been certified by ElectroSuisse, which is member of the International Certification Body (CB/IEC).

CE *The instrument meets the requirements of the CE mark as contained in the EU directives 89/336/EEC and 73/23/EEC and fulfils the following specifications:*

EN 61326 Electrical equipment for measurement, control and laboratory use – EMC requirements

EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use

Metrohm Ltd. is holder of the SQS-certificate of the quality system ISO 9001 for quality assurance in design/development, production, installation and servicing.

The system software, stored in Read Only Memories (ROMs) has been validated in connection with standard operating procedures in respect to functionality and performance.

The technical specifications are documented in the instruction manual.

Herisau, March 1, 2008

D. Strohm
Vice President
Head of R&D

Ch. Buchmann
Vice President
Head of Production
Responsible for Quality Assurance

5.4.3 Quality Management Principles

Metrohm Ltd., CH-9101 Herisau, Switzerland

Metrohm
Ion analysis
CH-9101 Herisau/Switzerland
E-Mail info@metrohm.com
Internet www.metrohm.com

Metrohm Ltd. holds the ISO 9001 Certificate, registration number 10872-02, issued by SQS (Swiss Association for Quality and Management Systems). Internal and external audits are carried out periodically to assure that the standards defined by Metrohm's QM Manual are maintained.

The steps involved in the design, manufacture and servicing of instruments are fully documented and the resulting reports are archived for ten years. The development of software for PCs and instruments is also duly documented and the documents and source codes are archived. Both remain the possession of Metrohm. A non-disclosure agreement may be asked to be provided by those requiring access to them.

The implementation of the ISO 9001 quality system is described in Metrohm's QM Manual, which comprises detailed instructions on the following fields of activity:

Instrument development

The organization of the instrument design, its planning and the intermediate controls are fully documented and traceable. Laboratory testing accompanies all phases of instrument development.

Software development

Software development occurs in terms of the software life cycle. Tests are performed to detect programming errors and to assess the program's functionality in a laboratory environment.

Components

All components used in the Metrohm instruments have to satisfy the quality standards that are defined and implemented for our products. Suppliers of components are audited by Metrohm as the need arises.

Manufacture

The measures put into practice in the production of our instruments guarantee a constant quality standard. Production planning and manufacturing procedures, maintenance of production means and testing of components, intermediate and finished products are prescribed.

Customer support and service

Customer support involves all phases of instrument acquisition and use by the customer, i.e. consulting to define the adequate equipment for the analytical problem at hand, delivery of the equipment, user manuals, training, after-sales service and processing of customer complaints. The Metrohm service organization is equipped to support customers in implementing standards such as GLP, GMP, ISO 900X, in performing Operational Qualification and Performance Verification of the system components or in carrying out the System Validation for the quantitative determination of a substance in a given matrix.

5.5 Index

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