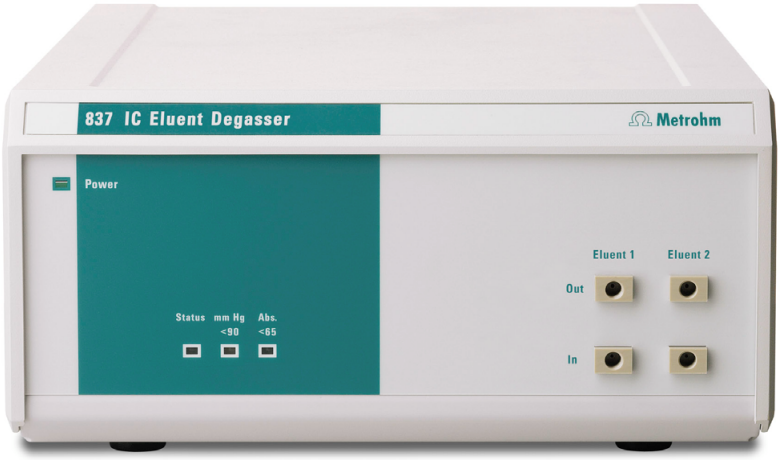
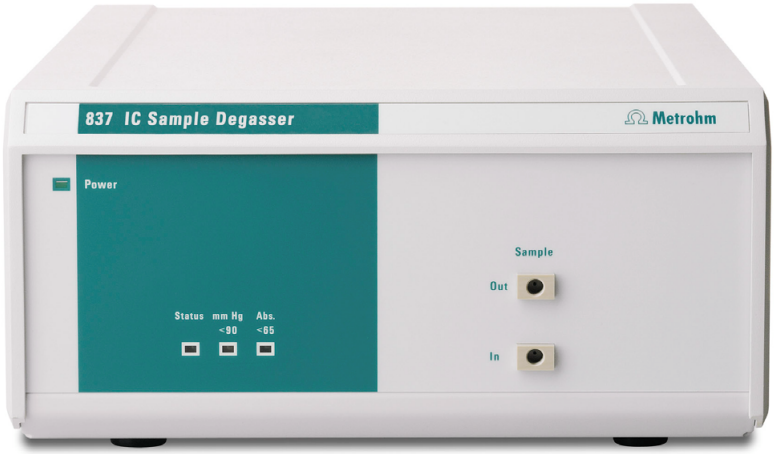
837 IC Degasser





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Instructions for Use
8.837.1003

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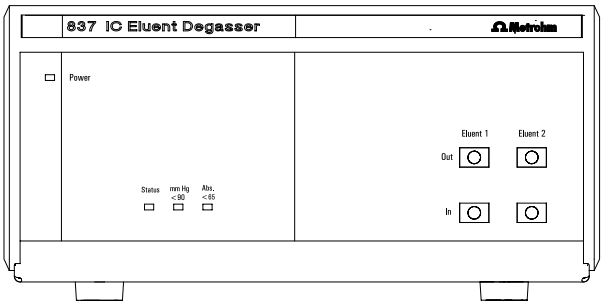
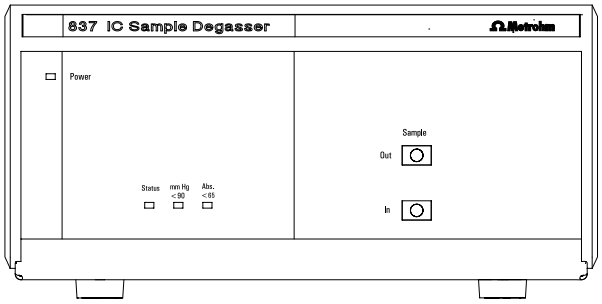
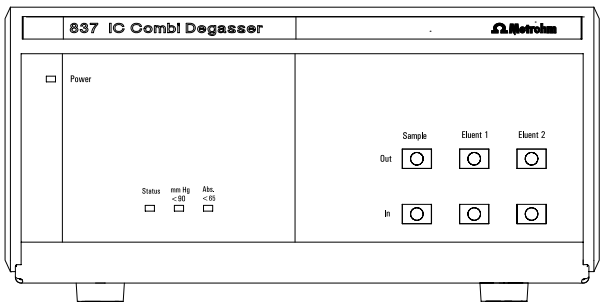
837 IC Eluent Degasser
837 IC Sample Degasser
837 IC Combi Degasser







Instructions for Use 8.837.1003

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1st Edition 2004

Although all the information given in these instructions has been checked with great care, errors cannot be entirely excluded. Should you notice any mistakes please inform the author at the address given above.

Table of contents

List of illustrations

1 Introduction

1.1 Instrument description

837 IC Eluent Degasser:

The 837 IC Eluent Degasser is used for degassing eluents. Gas bubbles in eluents produce an unstable baseline as high-pressure pumps for ion chromatography can transport liquids but not gases. This is why eluents must be degassed before use. The degasser module is simply included between the eluent and the IC pump. Then the eluent flows through the special Teflon-AF®-capillary, which is located in a vacuum chamber. The vacuum removes small gas bubbles, and reduces the content of solved gases like carbon dioxide or nitrogen. Time-consuming manual eluent degassing is no longer necessary. The 837 IC Eluent Degasser is equipped with two vacuum chambers so that two eluent flows can be degassed simultaneously.

837 IC Sample Degasser:

The 837 IC Sample Degasser is also used for degassing samples. For samples apply the same rules as for eluents: they cannot be injected directly, if they either contain or release gas bubbles. The indication of injecting samples containing gas bubbles is a poor reproducibility, because the amount of sample in the sample loop would vary. This means that these (gas-containing) samples must be degassed before the injection. The 837 IC Sample Degasser automates the degassing. Before the sample reaches the injection valve it passes a special Teflon-AF®-capillary, which is located in a vacuum chamber. The vacuum removes small gas bubbles, and reduces the content of solved gases like carbon dioxide or nitrogen. The 837 IC Sample Degasser is equipped with a large-volume vacuum chamber and, for example, allows direct determination of drinks containing carbon dioxide without any manual sample preparation.

837 IC Combi Degasser:

The 837 IC Combi Degasser is the combination of an 837 IC Eluent Degasser and an 837 IC Sample Degasser. Both degassing of eluents and degassing of samples can be carried out with it. The 837 IC Combi Degasser is simply included between eluent and IC pump or between sample and the injection valve. Eluent and sample then flow through the special Teflon-AF®-capillaries, which are located in separate vacuum chambers. The 837 IC Combi Degasser is equipped with a total of three vacuum chambers so that two eluent streams and one sample stream can be degassed simultaneously.

1.2 Parts and controls

*In this section you will find the numbers and designations of the parts and controls of the 837 IC (Eluent/Sample/Combi) Degasser. The numbering applies throughout the instructions for use, i.e. bold numbers in the text (e.g. **3**) refer to the parts and controls illustrated here.*

1.2.1 Front view 837 IC Eluent Degasser

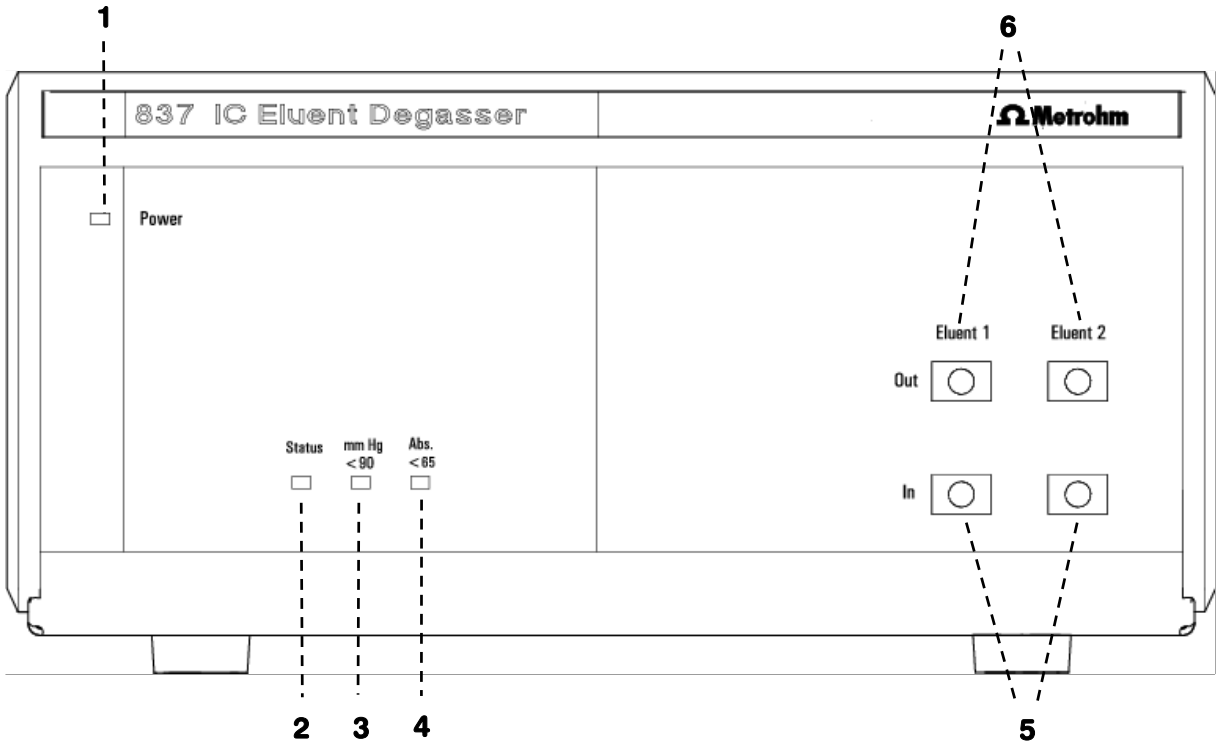


Fig. 1: Front view 837 IC Eluent Degasser

1 Mains pilot lamp
Lights up when instrument is switched on.

2 Status - display
Lights up when pump is running.

3 mm Hg <90 - display
Lights up when the pressure is between 90 and 65 mm Hg.

4 Abs <65 - display
Lights up when the pressure is below 65 mm Hg.

5 Inlets eluent streams
Inlets for 2 eluent streams.

6 Outlets eluent streams
Outlets for 2 eluent streams.

1.2.2 Front view 837 IC Sample Degasser

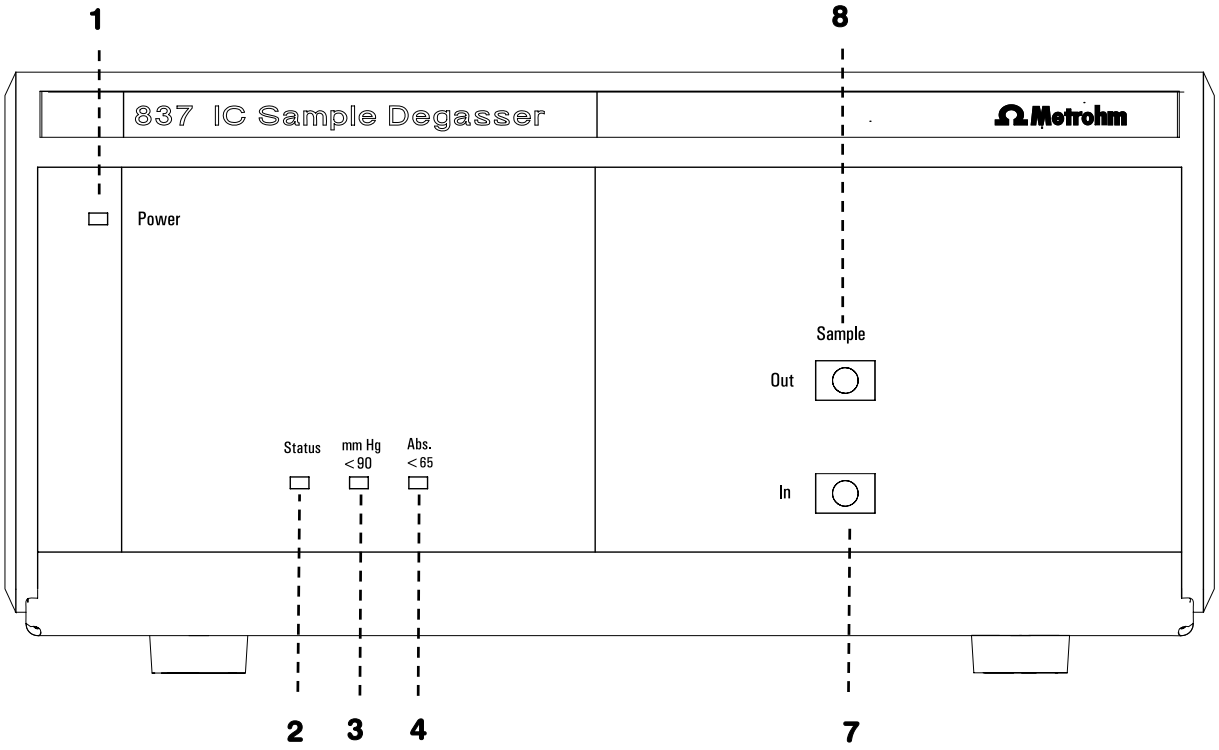


Fig. 2: Front view 837 IC Sample Degasser

1 Mains pilot lamp
Lights up when instrument is switched on.

2 Status - display
Lights up when pump is running.

3 mm Hg <90 - display
Lights up when the pressure is between 90 and 65 mm Hg.

4 Abs <65 - display
Lights up when the pressure is below 65 mm Hg.

7 Inlet sample stream
Inlet for 1 sample stream.

8 Outlet sample stream
Outlet for 1 sample streams.

1.2.3 Front view 837 IC Combi Degasser

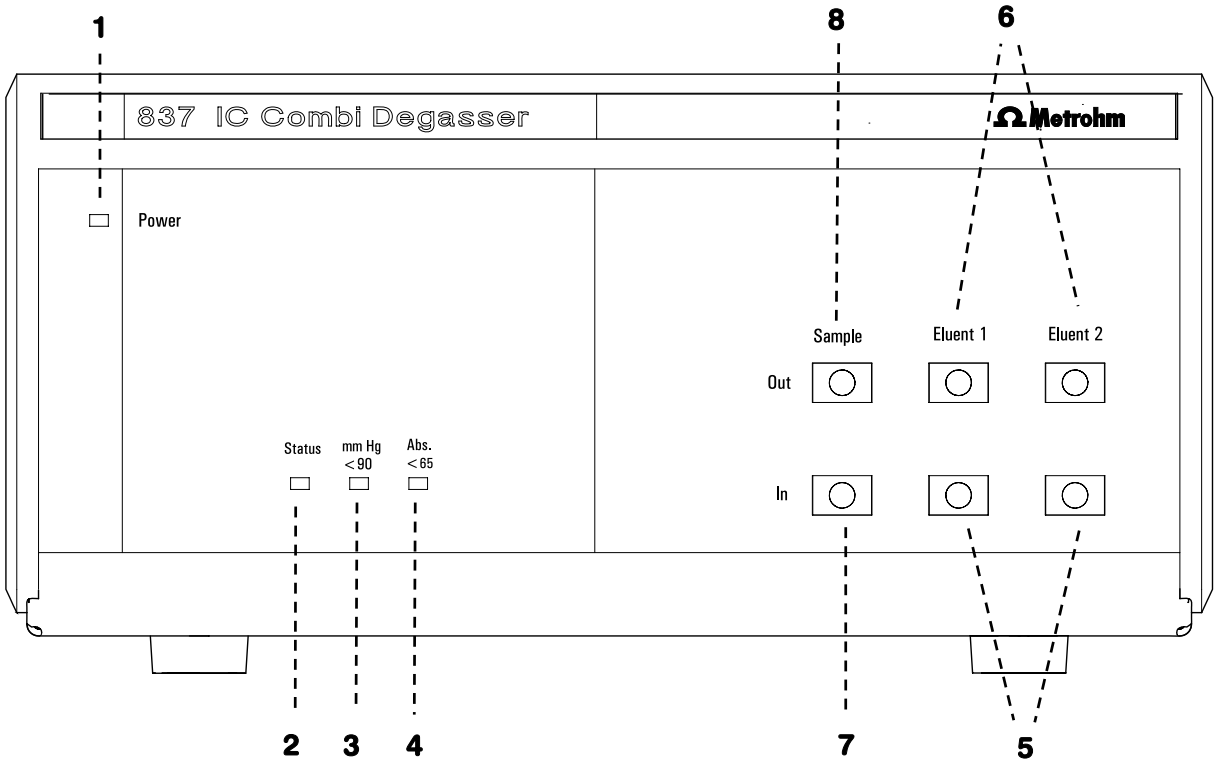


Fig. 3: Front view 837 IC Combi Degasser

1 Mains pilot lamp
Lights up when instrument is switched on.

2 Status - display
Lights up when pump is running.

3 mm Hg <90 - display
Lights up when the pressure is between 90 and 65 mm Hg.

4 Abs <65 - display
Lights up when the pressure is below 65 mm Hg.

5 Inlets eluent streams
Inlets for 2 eluent streams.

6 Outlets eluent streams
Outlets for 2 eluent streams.

7 Inlet sample stream
Inlet for 1 sample stream.

8 Outlet sample stream
Outlet for 1 sample stream.

1.2.4 Rear view 837 IC (Eluent/Sample/Combi) Degasser

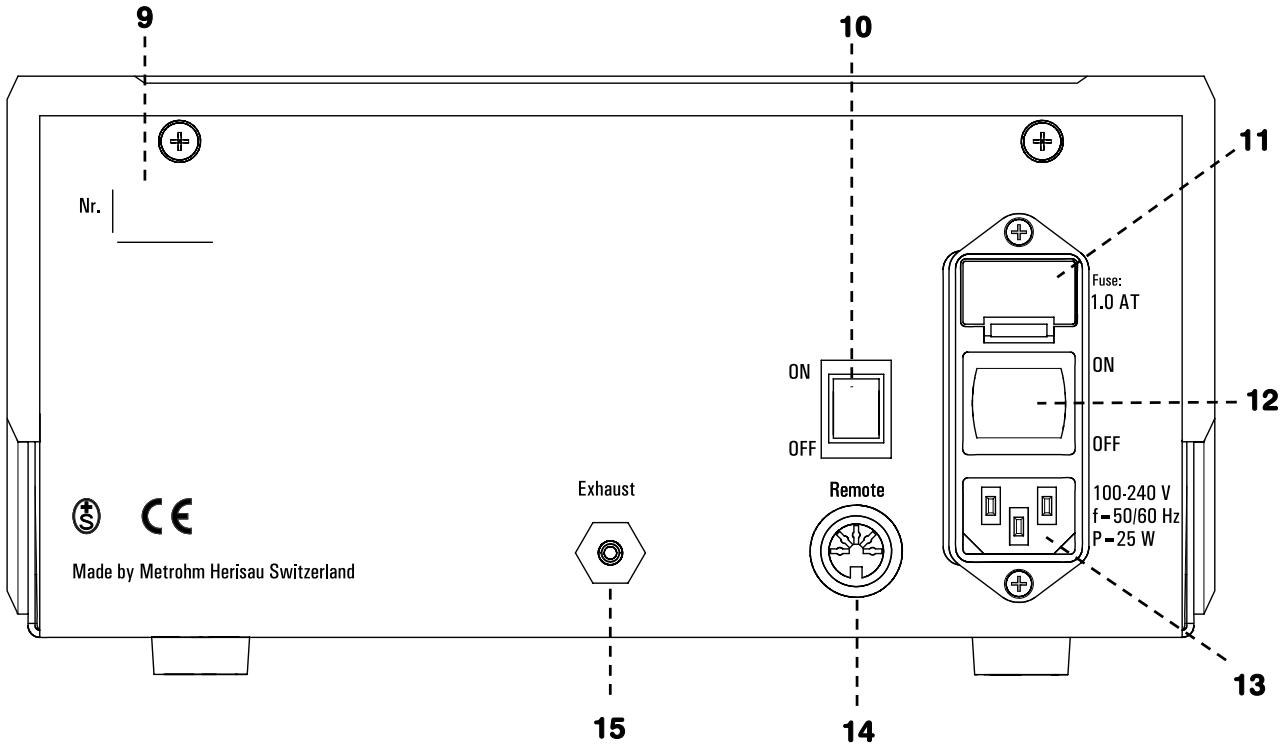


Fig. 4: Rear view 837 IC (Eluent/Sample/Combi) Degasser

9 Serial number

10 Remote switch
Activates the remote control.
ON: active
OFF: not active

11 Fuse holder
Changing the fuses, see *section 2.5.2.*

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

13 Mains connector
For mains connection see *section 2.5.3.*

14 Remote-Interface
For connection to 830 IC Interface or to 761 Compact IC.

15 Exhaust opening
Exhaust for gases.

1.3 Information about the Instructions for Use

Please study these Instructions for Use carefully before you start to use the 837 IC (Eluent/Sample/Combi) Degasser. The instructions contain information and warnings that must be observed by the user in order to guarantee the safe use of the instrument. Please keep these instructions near the instrument so that they are always to hand when required.

1.3.1 Organization

These **8.837.1003 Instructions for Use** for the 837 IC (Eluent/Sample/Combi) Degasser provide you with a comprehensive overview of the installation, startup, troubleshooting and technical specifications of the instrument. The instructions are arranged as follows:

Section 1 Introduction
General description of the instrument, operating parts and controls, and safety notes.

Section 2 Installation
Installation of the instrument, tubing connections, electrical connections, mains connection.

Section 3 Operation
General instructions, controls.

Section 4 Troubleshooting - Problems
Possible faults and their remedies, maintenance.

Section 5 Appendix
Technical data, standard equipment, optional accessories, warranty and declaration of conformity, index.

In order to find the information you require about the 837 IC (Eluent/Sample/Combi) Degasser, you should either use the **Contents** or the **Index**.

1.3.2 Notation and pictograms

The following notation and pictograms (symbols) are used in these Instructions:

7	Parts and controls
	**Danger/Warning** This symbol indicates a possible risk of death or injury to the user and possible damage to the instrument or its components by electricity.
	**Danger/Warning** This symbol indicates a possible risk of death or injury to the user and possible damage to the instrument or its components.
	**Attention** This symbol indicates important information that you should read before continuing.
	**Information** This symbol indicates additional information and tips which may be of particular use to you.

1.4 Safety notes

1.4.1 Electrical safety

Electrical safety when handling the 837 IC (Eluent/Sample/Combi) Degasser is guaranteed within the scope of Standard IEC/EN 61010-1 (protection class 1, degree of protection IP30). However, please observe the following points:

- **Mains connection**

*Set the **mains voltage** and check the **mains fuse** and **mains connection** in accordance with the instructions in section 2.5.*

- **Opening the instrument**

Inside the instrument there are no parts which must be set or adjusted by the user.

*The instrument may only be opened by specialized staff of Metrohm. If the 837 IC (Eluent/Sample/Combi) Degasser is connected to the mains supply then it must neither be opened nor should any parts be removed from it, as otherwise the risk of contact with current-carrying assemblies exists. This is why the instrument should be separated from all voltage sources before being opened. Please make sure that the **mains cable is pulled out from mains connector 13**!*

- **Protection against electrostatic charges**

Electronic components are sensitive to electrostatic charges and can be destroyed by a discharge. Before touching any assembly within the 837 IC (Eluent/Sample/Combi) Degasser you should ground yourself and any tool you are using by grasping a grounded object (e.g. the instrument housing or a radiator) in order to eliminate any electrostatic charge which may be present.

1.4.2 General safety measures

- **Liquid handling**

Check all inlet and outlet tubing for leaks at regular intervals. Observe the appropriate regulations concerning the handling of flammable and/or toxic solutions and their disposal.

2 Installation

2.1 Instrument setup

2.1.1 Packaging

The 837 IC (Eluent/Sample/Combi) Degasser and its specially packed accessories are supplied in very protective special packaging which contains a shock-absorbing plastic foam lining. The instrument itself is contained in a dustproof evacuated polyethylene bag. Please store this packaging in a safe place; it is the only way in which the safe transport of the instrument can be guaranteed.

2.1.2 Checks

Please check that the delivery is complete and undamaged immediately on receipt (compare with delivery note and list of accessories given in *section 5.2*). If transport damage is evident please refer to the information given in *section 5.5.1* "Warranty".

2.1.3 Location

Place the instrument on a suitable vibration-free laboratory bench, protected as much as possible from corrosive atmospheres and contact with chemicals.

To avoid disturbing temperature influences on the insulated column compartment, the pump and eluent reservoir must be protected against direct sunlight.

2.1.4 Arrangement of the instruments

The 837 IC (Eluent/Sample/Combi) Degasser should preferably be at the bottom of the IC System (If you use it together with the 833 IC Liquid Handling Unit: Place the 837 directly above the 833).

The 837 IC (Eluent/Sample/Combi) Degasser should always be placed at the bottom of the instrument stack so that any leaks which may occur in the pump tubing or connections cannot cause damage to the other instruments by leakage liquids.

2.2 Connecting the tubing

The tubing connections for eluent flow paths and sample flow paths are different.

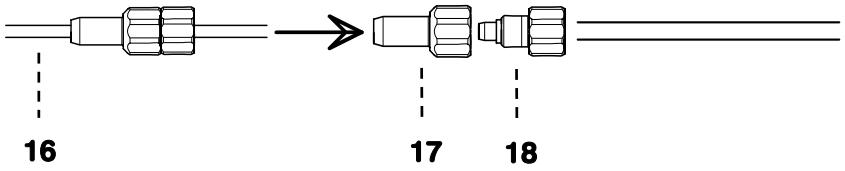
The tubing connections should be kept as short as possible. Cut the tubings to the lengths required by your system. To get a perfectly flat cut surface it is best to use the ***Capillary tubing cutter 6.2621.080****.*

2.2.1 Tubing connections for eluent flow path

To install the tubing connections for eluent degassing (with 837 IC Eluent Degasser or 837 IC Combi Degasser) proceed as follows:

1 Take down filter mount and clamping screw

To enable the insertion of the aspiration tubing 6.1834.020 (**16**) through the cover of the eluent bottle, the filter mount (**17**) and the clamping screw (**18**) have to be removed from the tubing end. Loosening the filter mount (**17**) makes both parts movable.

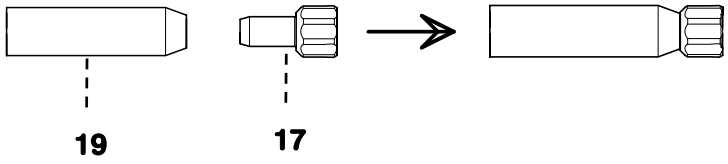


2 Insert aspiration tubing top down through the siphon of the eluent bottle

Put tube nipple (M8 thread) and O-ring of the eluent bottle siphon on the released tubing end of the aspiration tubing 6.1834.020 (**16**). Then insert that tubing end top down through the siphon of the eluent bottle, and tighten the tube nipple.

3 Screw aspiration filter onto filter mount

Screw the aspiration filter 6.2821.090 (**19**) onto the filter mount (**17**).



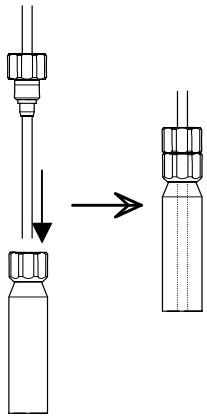
4 Put clamping screw back on the aspiration tubing

Put the clamping screw (**18**) back on the aspiration tubing.

5 Insert aspiration tubing into aspiration filter and screw together

Insert the aspiration tubing with clamping screw (**18**) through the filter mount (**17**) into the aspiration filter 6.2821.090 (**19**). Screw filter mount (**17**) and clamping screw (**18**) together until they are fixed to the aspiration tubing. The tubing end should contact the bottom of the aspiration filter, to prevent the formation of an air cushion. Proceed as follows:

- Place the aspiration filter with attached filter mount on a flat surface.
- Insert the aspiration tubing with clamping screw top down into the aspiration filter, until the tubing end contacts the bottom of the filter.
- Screw filter mount and clamping screw together.



6 Attach aspiration tubing to degasser

Screw the other end of the aspiration tubing (with pressure screw and flange) to an **Eluent** Inlet **In** (**5**) of the degasser (Initially, screw it in loosely by hand, then tighten it by using the wrench ¼" 6.2621.050 (also included in the standard equipment) to rotate the screw a further ¼ turn).

7 Connect degasser with pump

To connect degasser and pump, the tubing connection 6.1834.030 is used. Screw the tubing end with pressure screw and flange to the corresponding **Eluent** Outlet **Out** (**6**) of the degasser (Initially, screw it in loosely by hand, then tighten it by using the wrench ¼" 6.2621.050 (also included in the standard equipment) to rotate the screw a further ¼ turn). Connect the other end with the pump.

16 Aspiration tube for eluent (6.1834.020)
Tube to aspirate the eluent.

17 Filter mount
Mount, where the aspiration filter 6.2821.090 is screwed on.

18 Clamping screw of aspiration tubing
Can be fixed to the aspiration tubing by tightening the filter mount.

19 Aspiration filter (6.2821.090)
Filters the eluent when aspirating.

2.2.2 Tubing connections for sample flow path

To install the tubing connections for degassing of samples (with 837 IC Sample Degasser or 837 IC Combi Degasser) proceed as follows:

1 Connect sample changer with degasser

To connect sample changer and degasser, a connection tubing 6.1834.050 is used. The tube end with the clamping screw is connected via PEEK Coupling 6.2744.030 or 6.2744.034 to the pump tubing of the peristaltic pump (see *Instructions for Use* of the sample changer). Screw the other tube end with the pressure screw and the flange to the **Sample** Inlet **In** (**7**) of the degasser (Initially, screw it in loosely by hand, then tighten it by using the wrench ¼" 6.2621.050 (also included in the standard equipment) to rotate the screw a further ¼ turn).

2 Connect degasser with injection valve

To connect degasser and injection valve, another connection tubing 6.1834.050 is used. Screw the tube end with the pressure screw and the flange to the corresponding **Sample** Outlet **Out** (**8**) of the degasser (Initially, screw it in loosely by hand, then tighten it by using the wrench ¼" 6.2621.050 (also included in the standard equipment) to rotate the screw a further ¼ turn). Screw the other end with the clamping screw to the injection valve.

After installation is a good moment for the determination of the "Transfer time" of the sample flow (The time the sample needs to flow from the sample changer through the degasser till the end of the sample loop), see section 4.4.1. The "Transfer time" is important to know for the determination of the rinsing time – the longer the "Transfer time" is, the longer the rinsing time should be.

2.3 Connection to a modular IC system

To use the 837 IC (Eluent/Sample/Combi) Degasser in a modular IC-system connect it via an 830 IC Interface.

2.3.1 Electrical connection to 830 IC Interface

Always switch off the 837 IC (Eluent/Sample/Combi) Degasser before making new electrical connections.

The **837 IC (Eluent/Sample/Combi) Degasser** is normally integrated into the modular IC system via 830 IC Interface. Connect the remote-interface (**14**) of the degasser with a free event line at the 830 IC Interface using the cable 6.2128.180 according to the figure below. To activate the communication between the 830 IC Interface and the 837 IC (Eluent/Sample/Combi) Degasser, the remote-switch (**10**) on the Degasser must be set to **ON**.

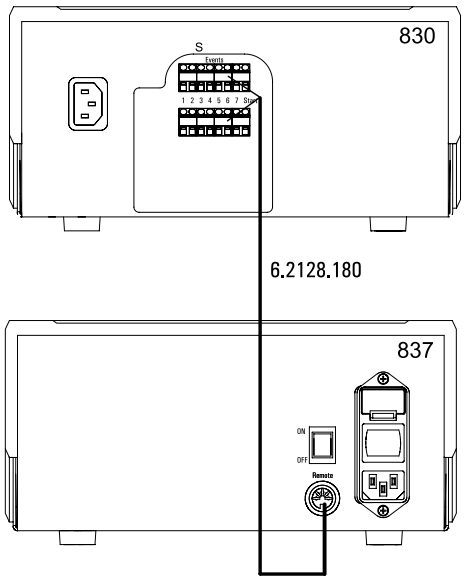


Fig. 5: Connection of 837 IC (Eluent/Sample/Combi) Degasser to 830 IC Interface

One cable 6.2128.180 is needed for each remote-connection. At the 830 IC Interface, connections can be established in two systems with 7 lines each. It doesn't matter which event lines are used for this, you just need to allocate them correctly when setting up the system in the software «IC Net» (see also *section 6.1* of the *«IC Net 2.3» Software-Manual*).

2.3.2 Settings in «IC Net»

Add the device to the system, as described in *section 6.1* of the *«IC Net 2.3» Software-Manual*. The settings and control elements for the Degasser in the «IC Net» are described in *section 6.21* of the *«IC Net 2.3» Software-Manual*.

2.4 Connecting to the 761 Compact IC

The installation of the 837 IC (Eluent/Sample/Combi) Degasser with the 761 Compact IC, and its control with the «761 PC Software» software is described below.

2.4.1 Electrical connection to the 761 Compact IC

Always switch off the 837 IC (Eluent/Sample/Combi) Degasser before making new electrical connections.

The electrical connections of the system consisting of the 761 Compact IC and the 837 IC (Eluent/Sample/Combi) Degasser are made according to the following figure. To activate the communication between the 761 Compact IC and 837 IC (Eluent/Sample/Combi) Degasser, the remote-switch (**10**) on the Degasser must be set to **ON**.

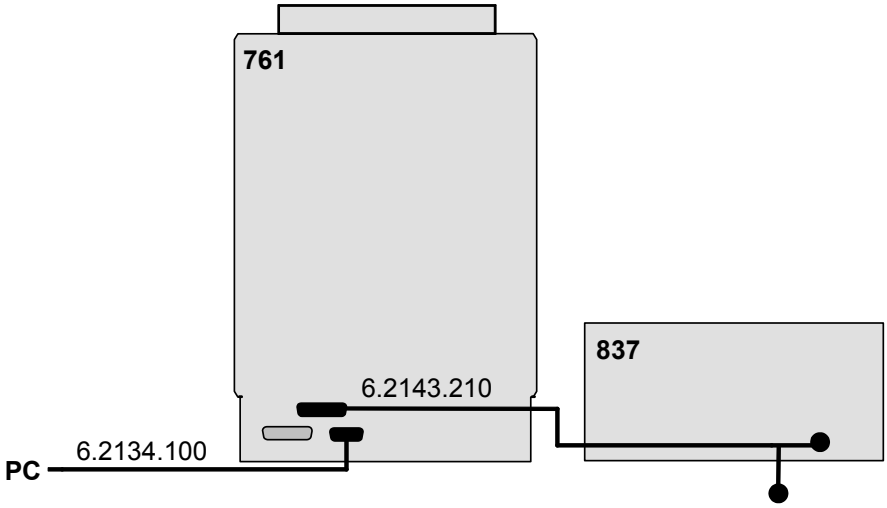


Fig. 6: Connecting the 837 IC (Eluent/Sample/Combi) Degasser to the 761 Compact IC

The remote-cable 6.2143.210 has a two-headed end with two DIN-plugs. The end **C** (labeled at the end of the cable) should be used for the Degasser. The end **B** is only needed, if an 828 IC Dual Suppressor is connected simultaneously.

2.4.2 Settings for control with the «761 PC Software»

Is the 837 IC (Eluent/Sample/Combi) Degasser connected to the 761 Compact IC via end **C** of the remote-cable 6.2143.210 as described above, the value for **Remote Line 2** in the software «761 PC Software» must be set to **1** (see *Instructions for Use 761 Compact IC*).

2.5 Mains connection

Please observe the following rules when connecting the instrument to the electricity supply. If the instrument is operated with an incorrectly set mains voltage and/or an incorrect mains fuse then it represents a fire hazard!

2.5.1 Mains voltage

All power supplies from 100 V to 240 V with 50/60 Hz can be connected to the mains input of the 837 IC (Eluent/Sample/Combi) Degasser. Adaptation to the mains supply used is carried out automatically.

2.5.2 Fuse

A 1.0 A fuse (slow blow) is contained in the fuse holder (**11**) of the 837 IC (Eluent/Sample/Combi) Degasser.

Make sure that the instrument is never operated with a different type of fuse as otherwise it represents a fire hazard!

Changing the fuse

1 Pull out mains cable

Switch off the instrument and remove the mains cable from mains supply connection (**13**) of the 837 IC (Eluent/Sample/Combi) Degasser.

2 Remove the fuse holder

Use a screwdriver to loosen the fuse holder beside the mains supply connection (see *Fig. 4*) and remove it completely.

3 Changing the fuse

Change the fuse if necessary and replace it in the fuse holder. Use only a fuse with the following specifications:

1.0 A fuse (slow blow) Metrohm-No. U.600.0016

4 Re-insert fuse holder

2.5.3 Mains cable and mains connection

Mains cable

The instrument is supplied with one of the following mains cables

6.2122.020 with SEV 12 plug (Switzerland, …)

6.2122.040 with CEE(7), VII plug (Germany, …)

6.2133.070 with NEMA 5-15 plug (USA, …)

which has three wires and is fitted with a plug with a grounding pin. If a different plug has to be used then the yellow/green wire (IEC standard) must be connected to the grounding pin (Protection class I).

Any interruption to the grounding inside or outside the instrument can represent a hazard!

Mains connection

Insert the mains cable into **mains connector 13** of the 837 IC (Eluent/Sample/Combi) Degasser.

2.5.4 Switching the instrument on/off

The 837 IC (Eluent/Sample/Combi) is switched on and off with **mains switch 12**. When the instrument is switched on, the "**Power**" **1** LED lights up.

3 Operation

3.1 General information

- The vacuum pump works at two levels. The first level is used to generate the vacuum, the second level to maintain it.
- The display **mm Hg <90** lights up orange if the pressure is between 65 and 90 mm Hg.
- The display **Abs <90** lights up green, if the pressure is below 65 mm Hg. This is the normal working status, and should be reached a few seconds after switching on the pump.
- The display **Status** lights up green, if the pump is switched on.

A new 837 IC (Eluent/Sample/Combi) Degasser device needs a certain running-in period to reach the optimal performance. Therefore all chambers should be run with eluent (for eluent flow paths) resp. ultrapure water (for sample flow paths) for one night before using it the first time.

3.2 Routine operation

3.2.1 Manual operation

If you want to operate the Degasser manually, proceed as follows:

1 Installation

Install the 837 IC (Eluent/Sample/Combi) Degasser as described in *section 2*.

2 Deactivate the remote-connection

Set the remote-switch **10** to **OFF**. The remote-connection is deactivated that way.

3 Switch on/off pump

Set the mains switch **12** to **I** to switch on the pump and to **0** to switch it off again.

3.2.2 Control with «IC Net»

If you want to control the degasser with «IC Net», install it as described in *section 2.3*. The control via «IC Net» is described in *section 6.21* of the *«IC Net 2.3» Software-Manual*.

4 Troubleshooting - Problems

4.1 Remedying faults and problems

If difficulties occur during analyses with your IC system then it is best to search for their causes in the following sequence: **column → pump → eluent → IC system**. In the "Instructions for Use" of your Modular IC system or 761 Compact IC you will find an overview of possible faults together with their causes and remedies.

In addition to these general problems, the following section covers those problems which could arise from the use of the 837 IC (Eluent/Sample/Combi) Degasser.

4.2 Chromatography problems

Instrument	*Problem*	*Cause*	*Remedy*
Sample/Combi Degasser (Sample flow path used) **2.837.0020** **2.837.0030**	Some **peaks larger**/**smaller** than expected	• **Carry-over** of sample from the previous measurement	• Extend rinsing time between two samples, see *section 4.4*
	Peaks smaller than expected	• **Leak** in system (Sample flow path) • **Blockage** in the flow path (Sample flow path)	• Check if liquid is leaking from the exhaust opening **15**. If yes, contact Metrohm Service. • Contact Metrohm Service
Eluent/Combi Degasser (Eluent flow path used) **2.837.0010** **2.837.0030**	**Poor retention time reproducibility**	• **Leak** in system (Eluent flow path) • **Blockage** in the flow path (Eluent flow path)	• Check if liquid is leaking from the exhaust opening **15**. If yes, contact Metrohm Service. • Siehe *Kap.4.3.*
	Noisy or **unstable baseline**	• **Leak** in system (Eluent flow path) • **Blockage** in the flow path (Eluent flow path)	• Check if liquid is leaking from the exhaust opening **15**. If yes, contact Metrohm Service. • Contact Metrohm Service

4.3 Instrument problems

Problem	*Cause*	*Remedy*
LED "Power" 1 does not light up (Mains switch **12** on **I**)	• **Mains cable** not connected • **Fuse** blown • **Electronics** fault	• Connect the Degasser to the mains supply • Replace fuse, see *section 2.5.2* • Contact Metrohm Service

Liquid is leaking from the exhaust opening (**15**)	• **Leak** in the instrument	• Contact Metrohm Service
LED "Abs <65" (**4**) **does not light up** (while pump is running)	• **Leak** in vacuum chamber • **Vacuum pump** does not work properly	• Contact Metrohm Service • Contact Metrohm Service

4.4 Carry-over with sample degassing

If you work with sample degassing (837 IC Sample/Combi Degasser), you should rinse longer (with the succeeding sample) because of the longer "Transfer time" (The time the sample needs to flow from the sample vial through the degasser till the end of the sample loop). The rinse time should be at least 2-3 longer than the "Transfer time", to minimize carry-over effects. The "Transfer time" itself depends on pumping capacity, total capillary volume and volume of the gas removed by the degasser (thus on the amount of gas in the sample).

4.4.1 Determination of the "Transfer time"

To determine the "Transfer time", the system (pump tube, tubing connections, Degasser capillary, sample loop) should be emptied. Pump air through the system for some minutes, until all liquid is displaced by air. Then, aspirate a typical (for your later application) sample, and measure the time the sample needs to flow from the sample vial till the end of the sample loop. The migration of the top of the sample flow can be observed with the eye. The measured time is the "Transfer time". The rinse time should be at least 2-3 times longer (Check carry-over, see *section 4.4.2*).

4.4.2 Check sample carry-over

Sample carry-over and required rinsing time can be checked by spiking a sample with an ion (which is not or only in small amounts contained by the original sample); for example phosphate for mineral water samples. Procedure:

1. Prepare two samples:
   a. **Sample A**: a sample, typical for your application
   b. **Sample B**: **Sample A** - spiked with a "Spike-Ion"
2. Let **sample A** flow through the sample flow path (for the duration of the rinsing time), inject it and measure
3. Let then flow **sample B** through the sample flow path (for the duration of the rinsing time), inject it and measure
4. Then let again **sample A** flow through the sample stream (for the duration of the rinsing time), inject it and measure

The ratio of the peak area of the "Spike-Ion" in the second measurement of **sample A** to the peak area in the measurement of **sample B** reflects the extend of the sample carry-over. The smaller that ratio is, the

smaller is the sample carry-over. You can change that ratio by varying the rinsing time – and hence identify the rinsing time needed for your application.

4.5 Care and maintenance

Instrument care

The 837 IC (Eluent/Sample/Combi) Degasser requires adequate care. Excessive contamination of the instrument could interfere with its functions and reduce the working life of the really robust mechanism and electronics.

Spilt chemicals and solvents should be removed immediately. The connections on the rear panel (and the mains connection in particular) should be protected against contamination.

Although the design prevents liquid penetration to a great extent, if aggressive media should enter the housing then pull out the mains plug of the 837 IC (Eluent/Sample/Combi) Degasser immediately, in order to prevent massive damage to the instrument's electronics. In such a case please contact the Metrohm Service Department.

The instrument may only be opened by specialized staff of Metrohm.

Maintenance by Metrohm Service

The maintenance of the 837 IC (Eluent/Sample/Combi) Degasser should take place within the framework of an annual service carried out by trained Metrohm technicians. 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.

5 Appendix

5.1 Technical specifications

Provided that nothing to the contrary is mentioned, the published data are typical values for the 837 IC (Eluent/Sample/Combi) Degasser at an ambient temperature of 25°C.

Vacuum

Pressure range	< 65 mm Hg
Generation time after start	< 30 s

Capillary in the degasser

Capillary volume	*Eluent:*	195 µL
	Sample:	670 µL
Material		Teflon AF
Solvent stability		Excellent stability against most solvents (Exception: PFCs)

Ambient temperature

Nominal operating range	+5..+45 °C (at max. 85 % atmospheric humidity)
Storage	-40...+70 °C
Transport	-40...+70 °C

Mains connection

Voltage	100…240 V (± 10%)
Frequency	50...60 Hz
Power consumption	25 W
Fuses	5 mm Ø, 20 mm long 1.0 AT (slow blow); must only be replaced by the same type.

Safety specifications

Construction and testing	According to IEC/EN 61010-1 / UL 3101-1, degree of protection IP30
Safety directions	This "Instructions for Use" include information and warnings which must be heeded by the user to assure safe operation of the instrument.

Electromagnetic compatibility (EMC)

Emitted interference	Standards met: - IEC/EN 61326 - EN 55022 - CISPR 22
Immunity to interference	Standards met: - IEC/EN 61326 - IEC/EN 61000-4-2 - IEC/EN 61000-4-3 - IEC/EN 61000-4-4 - IEC/EN 61000-4-5 - IEC/EN 61000-4-6 - IEC/EN 61000-4-8 - IEC/EN 61000-4-11 - IEC/EN 61000-4-14 - NAMUR

Housing

Cover material	Rigid polyurethane foam (PUR) with flame protection to flammability class UL94VO, CFC-free
Base material	Steel, enameled
Width	260 mm
Height	129 mm
Depth	366 mm
Weight	
837 IC Eluent Degasser:	4204 g
837 IC Sample Degasser:	4149 g
837 IC Combi Degasser:	4214 g

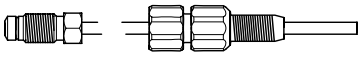
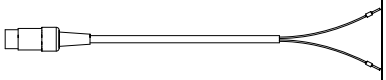
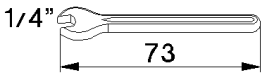
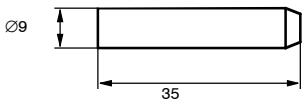
5.2 Scope of delivery

We reserve the right to make alterations!

All dimensions given in mm.

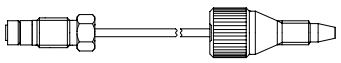
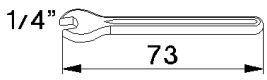
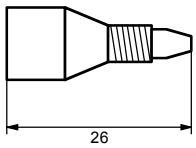
5.2.1 2.837.0010 IC Eluent Degasser

The 2.837.0010 IC Eluent Degasser includes the following parts:

No.	Order. no.	Description
1	1.837.0010	**IC Eluent Degasser**
2	6.1834.020	**Aspiration tubing to 837** (made of PTFE, with connector for aspiration filter 6.2821.090) Length = 1.5 m, i.d. = 1.5 mm, o.d. = 2.5 mm For the connection: 837 Eluent inlet – Eluent bottle 
2	6.1834.030	**Tubing connection 837- High pressure pump** (made of PTFE) Length = 0.5 m, i.d. = 1.5 mm, o.d. = 2.5 mm For the connection: 837 Eluent outlet - High pressure pump 
1	6.2128.180	**Remote connection cable** Connection cable: 830 IC Interface - 837 IC Degasser 
1	6.2621.050	**Wrench ¼"** 
1	6.2821.090	**Aspiration filter** pore size 20 µm For aspiration tubing 6.1834.020. Set of 5 pieces. 
1	6.2122.0X0	**Mains cable to customer's requirements**: Cable socket / Cable plug 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	8.837.1003	**Instructions for Use (English)** for 837 IC (Eluent/Sample/Combi) Degasser

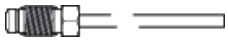
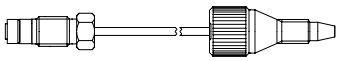
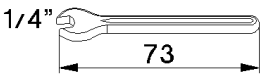
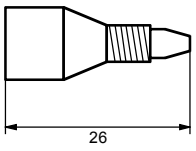
5.2.2 2.837.0020 IC Sample Degasser

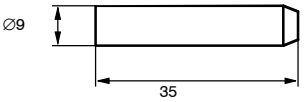
The 2.837.0020 IC Sample Degasser includes the following parts:

No.	Order. no.	Description
1	1.837.0020	**IC Sample Degasser**
2	6.1834.050	**Tubing connection 837 for sample flow** (made of PTFE) Length = 2.0 m i.d. = 1.5 mm, o.d. = 2.5 mm For the connections: 837 Sample inlet – Peristaltic tube of the sample changer and 837 Sample outlet – Injection valve 
1	6.2128.180	**Remote connection cable** Connection cable: 830 IC Interface - 837 IC Degasser 
1	6.2621.050	**Wrench ¼"** 
1	6.2744.014	**PEEK pressure screw** For connecting 1/16" capillaries. set of 2 pieces. 
1	6.2122.0X0	**Mains cable to customer's requirements**: Cable socket / Cable plug 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	8.837.1003	**Instructions for Use (English)** for 837 IC (Eluent/Sample/Combi) Degasser

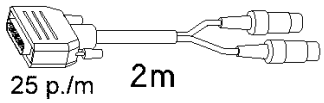
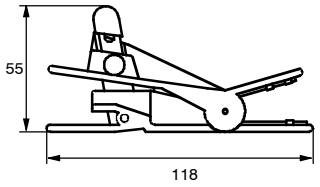
5.2.3 2.837.0030 IC Combi Degasser

The 2.837.0030 IC Combi Degasser includes the following parts:

No.	Order. no.	Description
1	1.837.0030	**IC Combi Degasser**
2	6.1834.020	**Aspiration tubing to 837** (made of PTFE, with connector for 6.2821.090 aspiration filter) Length = 1.5 m, i.d. = 1.5 mm, o.d. = 2.5mm For the connection: 837 Eluent inlet – Eluent bottle 
2	6.1834.030	**Tubing connection 837- High pressure pump** (made of PTFE) Length = 0.5 m, i.d. = 1.5 mm, o.d. = 2.5 mm For the connection: 837 Eluent outlet - High pressure pump 
2	6.1834.050	**Tubing connection 837 for sample flow** (made of PTFE) Length = 2.0 m i.d. = 1.5 mm, o.d. = 2.5mm For the connections: 837 Sample inlet – Peristaltic tube of the sample changer and 837 Sample outlet – Injection valve 
1	6.2128.180	**Remote connection cable** Connection cable: 830 IC Interface - 837 IC Degasser 
1	6.2621.050	**Wrench ¼"** 
1	6.2744.014	**PEEK pressure screw** For connecting 1/16" capillaries. Set of 2 pieces. 

No.	Order. no.	Description
1	6.2821.090	**Aspiration filter** pore size 20 µm For aspiration tubing 6.1834.020. Set of 5 pieces. 
1	6.2122.0X0	**Mains cable to customer's requirements**: Cable socket — Cable plug 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	8.837.1003	**Instructions for Use (english)** for 837 IC (Eluent/Sample/Combi) Degasser

5.3 Optional accessories

Order. no.	Description
6.2143.210	**Connection cable** 761 Compact IC – 837 IC (Eluent/Sample/Combi) Degasser DIN Plug **C** (labeled at the end of the cable) should be used for the Degasser (**C** is connected with Remote Line 2 of the Compact IC 761). Connect other devices via DIN Plug **B**. 
6.2621.080	**Capillary cutter for plastic capillaries** with 5 spare cutting blades. 

5.4 Validation / GLP

GLP (**G**ood **L**aboratory **P**ractice) requires, among other things, that the precision and correctness of analytical instruments is checked at regular intervals by using SOPs (**S**tandard **O**perating **P**rocedures, **SOP**). An example of such a standard operating procedure is available from Metrohm under the title **«Application Bulletin No. 277 – Validation of Metrohm Ion Chromatography Systems by using Standard Operating Procedures (SOP)»**. This SOP can be adapted for your ion chromatography system and used for its validation.

The 837 IC (Eluent/Sample/Combi) Degasser must be included as a part of the whole ion chromatography system, whose most important components include the pumps, separation columns, detector and evaluation system, in the all-embracing validation of the whole system.

Please contact your local Metrohm agency in order to receive support in validating your 837 IC (Eluent/Sample/Combi) Degassers. It can also provide you with validation documentation which will help you to carry out your installation qualification (IQ) and operational qualification (OQ).

Further information about QA, GLP and validation can also be found in the brochure «**Quality management with Metrohm**» which is also obtainable from your local Metrohm agency.

Checking the electronic and mechanical assemblies of Metrohm instruments can and should be undertaken within the framework of regular servicing by Metrohm technicians. All Metrohm instruments are equipped with start-up check routines which check that the relevant assemblies are functioning perfectly when the instrument is switched on. If no error message appears it can be assumed that the instrument is functioning properly.

The 837 IC (Eluent/Sample/Combi) Degasser also contains a built-in diagnosis program which allows the service technicians to check the functioning of particular assemblies should faults or malfunctions occur and to localize them.

5.5 Warranty and conformity

5.5.1 Warranty

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

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

Glass breakage in the case of electrodes or other parts is not covered by the warranty. Checks which are not a result of material or manufacturing faults are also charged during the warranty period. For parts from outside manufacturers, insofar as these constitute an appreciable part of our instrument, the warranty stipulations of the manufacturer in question apply.

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

Concerning defects in materials, construction or design as well as the absence of guaranteed features the purchaser has no rights or claims except those mentioned above.

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

If any instruments and parts have to be returned then the original packaging should be used if at all possible. This applies above all to instruments, electrodes, buret cylinders and PTFE pistons. Before embedment in wood shavings or similar material the parts must be packed in a dustproof package (for instruments the use of a plastic bag is essential). If open assemblies are included that are sensitive to electromagnetic voltages (e.g. data interfaces, etc.) then these must be returned in the associated original protective packaging (e.g. conductive protective bag). (Exception: assemblies with a built-in voltage source belong in non-conductive protective packaging).

For damage which arises as a result of non-compliance with these instructions no warranty responsibility whatsoever will be accepted by Metrohm.

5.5.2 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	**837 IC (Eluent/Sample/Combi) Degasser**
Name of manufacturer	Metrohm Ltd., Herisau, Switzerland

Description

2.837.0010 IC Eluent Degasser
Instrument for the continuous degassing of two eluent streams.

2.837.0020 IC Sample Degasser
Instrument for the continuous degassing of a sample stream.

2.837.0030 IC Combi Degasser
Instrument for the continuous degassing of two eluent streams and one sample stream.

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

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

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

Safety specifications
IEC/EN 61010-1, UL 3101-1 protection class I

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

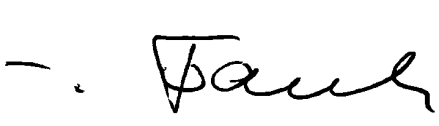
The instrument meets the requirements of the CE mark as contained in the EU directives 89/336/EEC and 73/23/EEC and fulfils the following specifications:

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 technical specifications are documented in the instruction manual.
The instruments were validated with respect to functionality, analytical performance and accuracy of results. The instrument functions are documented in the instruction manual.

Herisau, March 13, 2003



Dr. J. Frank
Development Manager

Ch. Buchmann
Production and
Quality Assurance Manager

5.5.3 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 organisation 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 organisation 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.

5.5.4 Index