

Installation Instruction for ProfIC Vario 10 Anion

ProfIC Vario 10 Anion is a Professional IC Vario system with Inline Neutralization possibilities. When strongly acidic or alkaline samples are analyzed, Inline Neutralization is recommended. This technique allows such samples to be automatically prepared during sample delivery and then analyzed directly.

A small volume of the sample is transferred fully automatically to the preconcentration column. During transfer, it passes through the sample preparation module where the cation exchange takes place. This means that it is possible to neutralize both acidic and alkaline samples. The purified and pH-neutral sample is then transferred to the IC system.

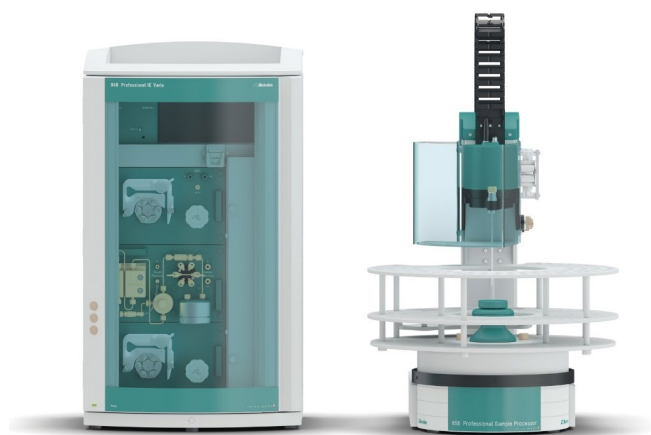


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1. Delivery Package

Delivered with ProFI C Vario 10 Anion package:

Nr	Article no.	Article designation
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IC

1	2.940.1530	Professional IC Vario ONE/SeS/PP/Prep 3
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Detector

1	2.850.9010	IC Conductivity Detector
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Sample processor

1	2.858.0030	Professional Sample Processor - Pump - Injector
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Accessoires

1	6.2835.000	SPM Rotor A
1	6.1602.150	Bottle attachment / GL 45 - 2 × UNF 10/32
1	6.1608.070	Eluent bottle / 2 L / GL 45
1	6.1825.230	PEEK sample loop 10 µL

Optional

1	6.6059.4*	MagIC Net 4.* Professional (* newest MagIC Net version)
1	6.6059.4*	MagIC Net 4.* Multi (* newest MagIC Net version) - 3 licenses
1	6.2041.760	Sample rack 54 × 11 mL + 1 × 300 mL
1	6.2041.440	Sample rack 148 × 11 mL + 3 × 300 mL
1	6.2743.040	Sample tubes 2.5 mL
1	6.2743.050	Sample tubes 11 mL
1	6.2743.070	Stopper with perforation
1	6.xxxx	Metrosep A Supp column depending on application
1	6.xxxx	resp. Metrosep A Supp Guard col.
1	6.1006.310	Metrosep A PCC 1 HC/4.0
1	6.2832.000	MSM Rotor A
1	6.2842.000	MSM - HC Rotor A
1	6.2844.000	MSM - LC Rotor A
1	6.2842.020	Adapter sleeve, MSM
1	2.941.0010	941 Eluent Production Module
1	6.5330.130	IC Equipment: LQH Station
1	2.800.0100	800 Dosino
1	6.1580.150	807 Dosing Unit 5 mL
1	6.2744.080	M6 thread / UNF 10/32 coupling

2. Installation

Following is a detailed description of how to install a ProFI C Vario 10 Anion.

We strongly recommend that the individual steps are carried out in the order given below.

2.1. Installation of the software

All programs must be shut down first. Make sure no Metrohm instrument is connected to the PC. Install MagIC Net with the help of the MagIC Net CD. The Microsoft Installation Wizard is accepted and executed. All the standard directories proposed by the program should be accepted. Restart Windows.

Now as soon as you connect a new Metrohm instrument to the PC via USB, the driver is installed and a window will pop up in MagIC Net asking if you'd like to store this device in your configuration. If you do, please answer with yes. The names will be checked later in this installation instruction.

2.2. Accessory Kit: Vario/Flex Basic (6.5000.000)

Using the Accessory Kit Vario/Flex Basic, install the Professional IC Vario. Remove the handle, place the detector block in the instrument, and connect the detector cable. Then, remove the transport locking screws, connect the leak sensor cable, and connect the drainage tubing.

Next, set up the waste collector by assembling the cap and screwing it onto the vessel. Then hang the waste collector holder on the side of the IC so the droplets can be observed coming out of the capillaries that are later connected to the collector. Attach the waste tube to the vessel and lead it to the waste canister. If the tube is too long, please shorten it, because it is important to have a high level difference for the liquid to drain properly.

The power cable and USB cable (6.2151.020) are plugged into the rear of the Professional IC Vario. Please don't switch on the instrument yet. This step will follow after the installation is completed.

2.3. Accessory Kit: Vario/Flex ONE (6.5000.010)

In the box with the Accessory Kits ONE, you will find all the accessories for setting up the eluent bottle. Please lead the aspiration tube for the eluent through the M8 stopper, the O-ring, and the eluent cap. Then fix the white weight (6.2744.210), the adaptor (6.2744.210) and the aspiration filter (6.2821.090) on the eluent aspiration tube, all the while being careful not to touch the filter and its connections with bare hands in order to avoid cross contamination. Also secure the filled adsorber tube on the eluent cap. Please refer to the 940 Professional IC Vario manual for a detailed description.

2.4. 858 Professional Sample Processor

For a detailed description, please refer to the 858 Professional Sample Processor manual. In general, you will have to do the following: first, plug in the Swing Head connection cable and the power supply cable. The controller cable (6.2151.000) is plugged into the plug "Contr." on the 858 and connected to the IC device via USB. The Sample Processor initializes and lifts its Swing Head, once the IC device it is connected to is recognized by the software. For this, you have to plug the USB cable of the IC into the PC and turn it on. Afterwards, it is possible to mount the retaining plate, the needle, and the safety shield.

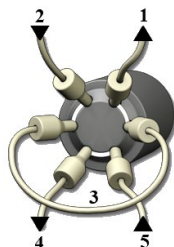
For the following installations, please shut down the IC again and disconnect the 858 Professional Sample Processor from the power source.

2.4.1. Capillary connections on the 858

The sample volume is measured with a sample loop which is placed on an additional valve and is then washed off (by means of a transfer solution) through the Inline Neutralization module onto a preconcentration column. The transfer solution can be either ultrapure water or a diluted solvent.

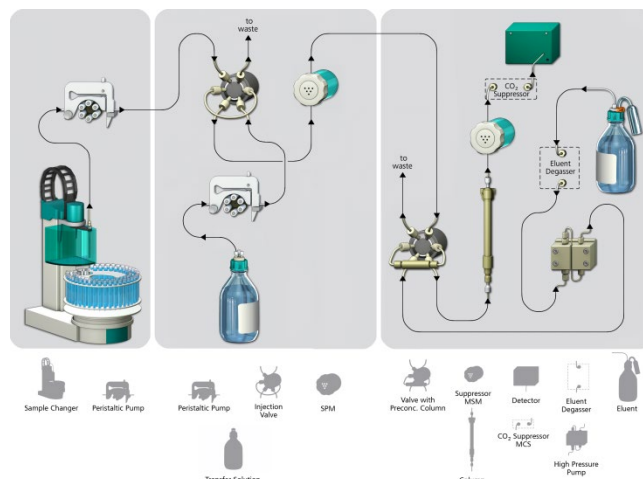
The injector at the 858 Professional Sample Processor needs to be equipped in the following way:

1. Sample outlet capillary - PTFE, 0.5 mm ID, to be placed into the waste collector
2. Sample aspiration capillary - PTFE, 0.5 mm ID, connected to the aspiration tube on the Swing Arm via the white/white peristaltic pump tubing (6.1826.360)
3. 10 µL sample loop (6.1825.230)
4. Transfer solution outlet capillary - PTFE, 0.5 mm ID, to be connected to the inlet of the SPM module
5. Transfer solution inlet capillary - PTFE, 0.5 mm ID, connected to the transfer solution bottle via the white/white peristaltic pump tubing (6.1826.360)



2.5. Interconnection of devices

The entire setup of the ProfIC Vario 10 Anion package is depicted here:



Prepare and degas an eluent suitable for the column you plan to use (see column manual). For the Metrosep A Supp 15/4.0, a solution of 5.0 mmol/L Na_2CO_3 + 0.3 mmol/L NaOH is adequate.

Provide the regeneration solution for the MSM suppressor (100 mmol/L sulfuric acid) and also the regeneration solution for the SPM suppressor (50 mmol/L perchloric acid).

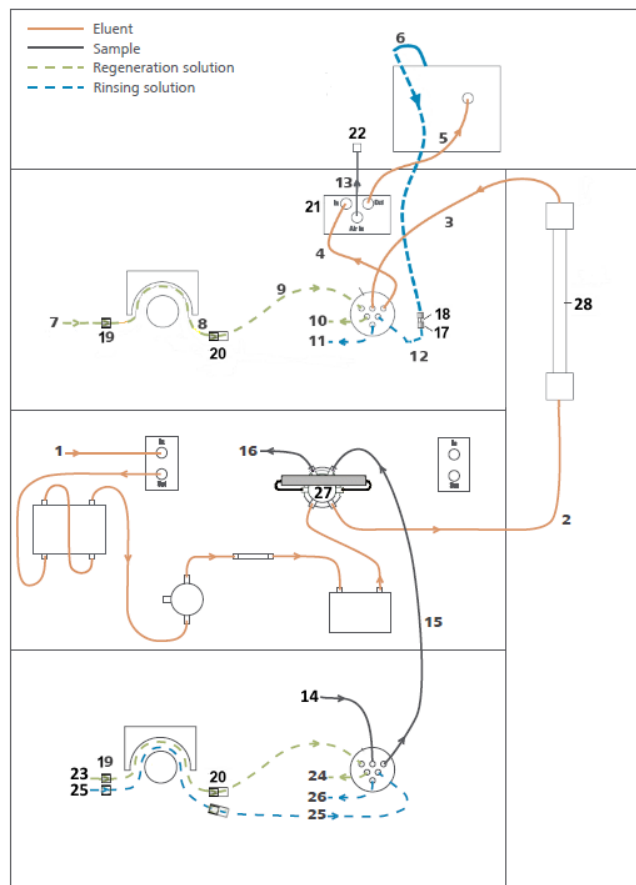
2.6. 940 Professional IC Vario

Capillaries are connected according to the following list and diagram:

1. Connection to the eluent bottle
2. Capillary to Column inlet – 0.25 mm ID
3. MSM inlet capillary – labeled with *in*
4. MSM outlet capillary – labeled with *out* – can be connected to the MCS or directly to the detector using a coupling (6.2744.040)
5. Detector inlet capillary
6. Detector outlet capillary connected to the MSM inlet capillary – labeled with *rinsing solution* – with the help of a coupling (6.2744.040)
7. Regeneration solution aspiration capillary – PTFE, 0.5 mm ID, connected to the bottle with 100 mmol/L sulfuric acid and the orange/yellow pump tubing (8). This pump tubing is, on the other side, relayed to the regeneration solution capillary of the MSM – labeled with *regenerant* – with a security lock and filter (19)
8. Peristaltic pump tubing with orange/yellow stoppers (6.1826.420)
9. MSM regeneration inlet capillary – labeled with *regenerant*

10. MSM regeneration solution outlet capillary – labeled with *Waste reg.* – to be connected to the waste collector
11. MSM rinsing solution outlet capillary – labeled with *waste rins.* – to be connected to the waste collector
12. MSM rinsing solution inlet capillary – labeled with *rinsing solution* – connected to the detector outlet capillary with a coupling (6.2744.040)
13. MCS air aspiration capillary – connected to the CO₂-adsorber cartridge
14. Sample aspiration capillary from the injector at the Sample Processor position 4 to the PTFE SPM capillary connection (ID 0.5 mm) – labeled *in*
15. SPM outlet capillary – labeled *out* – connected to the injection valve position 1
16. Transfer solution outlet – PTFE, 0.5 mm ID, to be placed into the waste collector
17. PEEK pressure screw short (6.2744.070)
18. Coupling 2× UNF 10/32 PEEK (6.2744.040)
19. Coupling nozzle - UNF 10/32 (6.2744.034)
20. Pump tubing connector with security lock and filter (6.2744.180)
21. PEEK pressure screw long (6.2744.090)
22. Luer coupling – connect with short PEEK pressure screw to CO₂-adsorber cartridge
23. SPM regeneration inlet capillary – labeled with *regenerant* – connected to the bottle with 50 mmol/L perchloric acid and the orange/yellow pump tubing. On the other side, the peristaltic pump tubing is connected to the regeneration solution aspiration capillary – PTFE, 0.5 mm ID.
24. SPM regeneration solution outlet capillary – labeled with *Waste reg.* – to be connected to the waste collector
25. SPM rinsing solution inlet capillary – labeled with *rinsing solution* – connected to the black/black pump tubing. On the other side the tubing is connected to the rinsing solution aspiration capillary – PTFE, 0.5 mm ID which leads to the bottle with ultrapure water
26. SPM rinsing solution outlet capillary – labeled with *waste rins.* – to be connected to the waste collector
27. Metrosep A PCC 1 HC/4.0 (6.1006.310) – IC preconcentration column, to be connected to the valve with PEEK capillaries (ID 0.25 mm), instead of a loop, flow direction should go with the eluent (left to right)

28. The UNF 10/32 coupling (6.2744.040) is installed instead of the column to rinse the system with eluent. After rinsing, the column is installed.

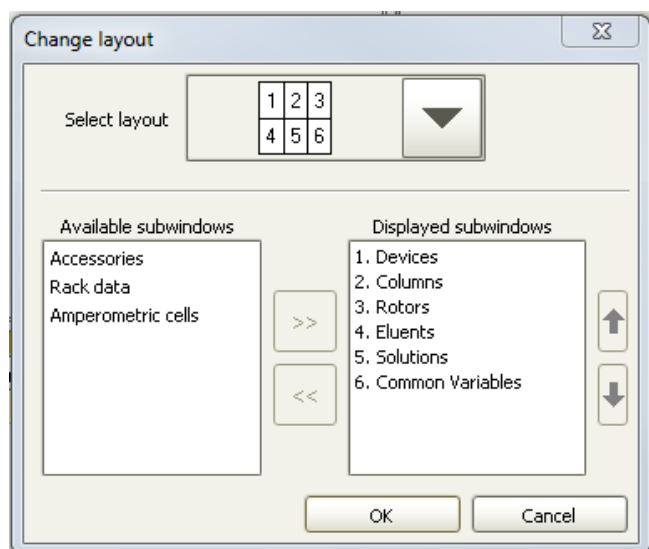


Make sure that all outlet capillaries are put into the waste collector.

3. MagIC Net

3.1 Configuration

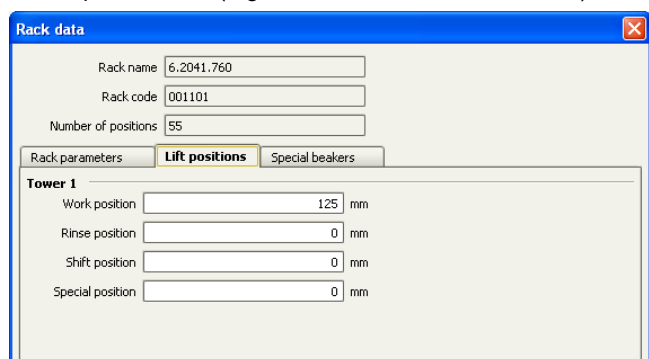
Please adjust the “view layout” of the configuration. Configure it in the following way (the order of the sub windows is up to you):



Now connect the USB cables from the instruments and turn their power on. Connected USB devices are automatically recognized when MagIC Net is started. After confirmation of the automatically generated requests, the devices and columns are stored in the configuration. The devices are predefined as "940 Professional IC Vario 1" and "858 Professional Sample Processor 1". Name them accordingly, if other names appear in your configuration (e.g., due to changed settings on your computer).

In the window configuration, the 940 Professional IC Vario, the 858 Professional Sample Processor and the column Metrosep A Supp 15 - 150/4.0 are visible. Add and define the eluent, the suppressor solutions, and the MSM and SPM Rotors.

The settings for the rack require a "work position" fitting to the respective rack (e.g., 125 mm for rack 6.2041.760).



3.2 Method adjustment

The method for this configuration can be found in the example method folder on your MagIC Net CD. In the method window, import the method for ProfIC Vario 10 Anion from the installation CD: Go to File → method manager and choose your method group. Afterwards, click on edit → import and choose the pathway on the installation

CD: MagICNet\examples\methods\ProfIC Vario \ProfIC Vario_10_Anion.imet

In the window "Method", open the ProfIC Vario 10 Anion method and assign the following equipment: first, assign the suppressor solution to the IC peristaltic pump 1 and set the speed rate to 1. Then add the MSM Rotor defined in the configuration for the IC peristaltic pump 2, also set the speed rate to 1, and add the SPM Rotor defined in the configuration. Next, link the rack of the connected Sample Processor, assign the eluent to the IC pump, and assign the Metrosep A Supp 15 - 150/4.0 column to the anion analysis. Adjust the temperature of the column oven to 45 °C.

Perform a method test and save the method.

3.3. Purge of the system

Before inserting the column, disconnect the Out capillary of the MSM suppressor connection piece from the MCS or from the detector and put it into a waste beaker. The suppressor needs to be rinsed with the system first and its waste should not pass through the sensitive MCS and/or detector in the beginning, as loose particles could be flushed out.

Flush the system for about 10 minutes and eliminate air bubbles (by using the purge valve and syringe). During these 10 minutes, step the MSM three times in order to flush all three chambers.

As soon as the entire system is purged, reconnect the MSM suppressor Out capillary back to the MCS or the detector.

Now insert and rinse the precolumn for 10 minutes by leading the outlet directly into the waste. Afterwards connect the analytical column and flush it likewise for 10 minutes. Only afterwards is the column is completely connected to the flow path of the eluent (see the 940 Professional IC Vario manual for more details). Start the peristaltic pump and adjust the pressure of the lever on the tubing in order to see the droplets of suppressor regeneration solution drop into the waste collector.

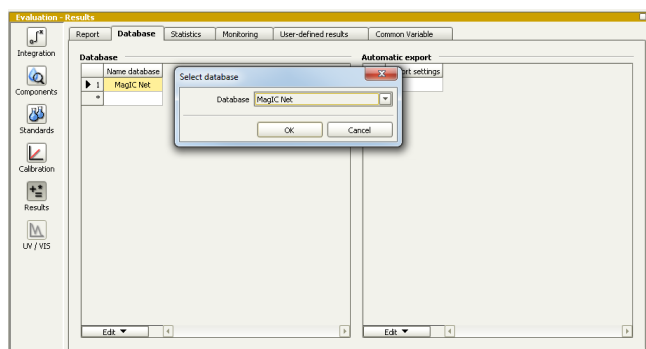
In order to start the equilibration, go to the window workplace, load the anion method, and press "Start HW".

Equilibrate the system until the baseline is stable.

3.3 User-defined determination

In the method window, enter the ions and the concentrations of the required standards.

Now add the correct Database in the Evaluation window (Evaluation → Results → Database) for the method.



In the window workplace, set up a “determination series”, describing your samples by ident, vial number, sample type (standard, blank, check standard, or sample, etc.). After putting the analyte solutions onto the rack, press “Start”.

For evaluation and after recording the first chromatogram, check the retention times of your compounds. Since they depend on the performance of your column, you may have to adjust them in your method.

4. Optional equipment

4.1. Liquid Handling Station

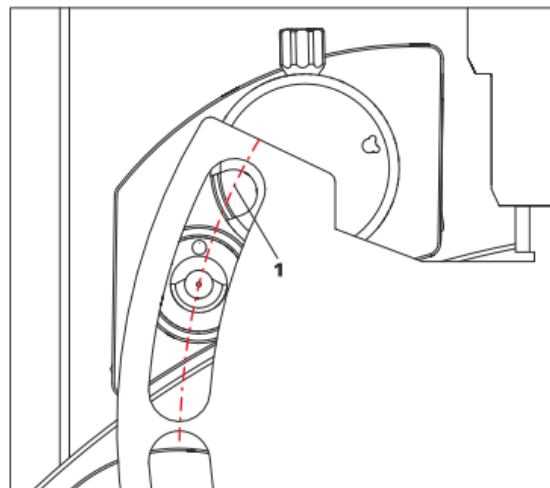
The Liquid Handling Station (LQH Station) consists of two functional units: the rinsing unit and the dilution unit. As an add-on, it is mainly useful for rinsing the needle both on the inside and outside, thus minimizing contamination.

The following accessories are needed:

Nr	Article no.	Article designation
1	6.1819.100	FEP aspiration tubing to 2 L bottle
1	2.800.0010	800 Dosino
1	6.1580.150	5 mL 807 Dosing Unit
1	6.1014.200	Metrosep I Trap 1 - 100/4.0
1	6.1608.070	Eluent bottle /2 L / GL 45
1	6.1831.180	PEEK capillary ID 0.5 mm, 3 m
1	6.2744.010	Pressure screw 5×
1	6.2841.120	Liquid Handling Station left
1	6.2744.080	M6 thread/UNF 10/32 coupling

The installation of the LQH Station is done in two steps. First mount and align the Liquid Handling Station on the left-hand side of the Sample Processor. To accomplish this, remove the sample rack and place the Liquid Handling Station on the black rail of the Sample Processor. Secure it temporarily in place with the screw and then loosen the small screws of the foot. The rack is replaced on the Sample Processor and the small screws are fixed in a way that the approximate distance between the LQH Station and the rack is 0.5–1 mm.

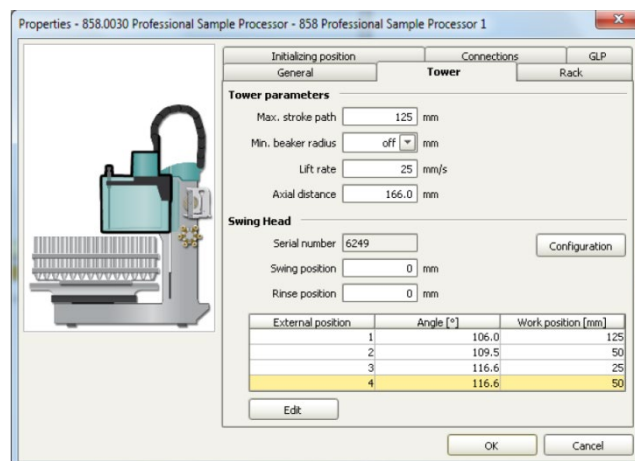
Now the Liquid Handling Station must be aligned with the retaining plate. For this, loosen the big screw again and move the LQH Station underneath the retaining plate. Looking from above, you should now be able to see the small hole of the rinsing unit and part of the larger hole of the dilution vessel, similar to the following diagram.



When you have found the correct position, please tighten the screw to secure the LQH Station completely to the Sample Processor.

In a second step, the work positions for the sample tube need to be defined in the configuration.

Please go to the configuration of the Sample Processor. Under Tower, it is possible to define external positions of the Swing Head. For rinsing purposes, only the External Position 1 (small inner tube) and the External Position 2 (outer tube of rinsing unit) have to be defined. The proposed angles are only guiding values; they need to be adapted for every system separately. This can be done easily by adjusting the angles in the manual control window. As soon as you have found the correct angles, make sure to save them in the configuration. The work positions are fixed for all of the different setups.

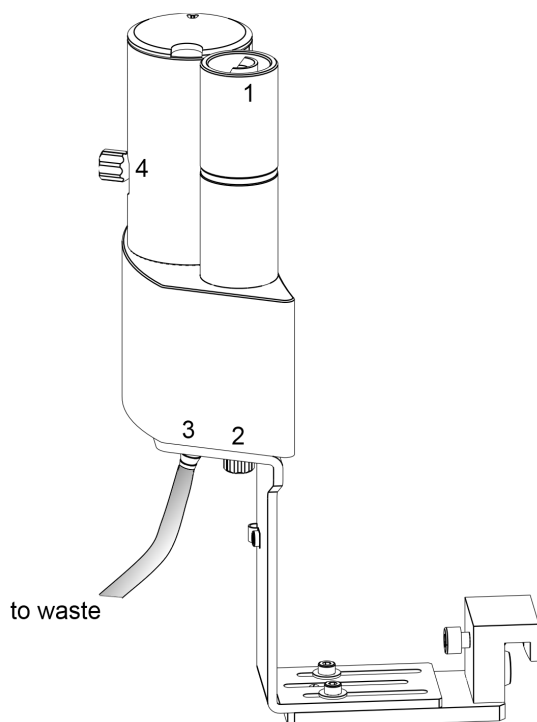


Mount the Dosino on the 5 mL 807 Dosing Unit and connect the FEP aspiration tube M6 (6.1819.100) on Port 2 of the 807 Dosing Unit. Then, fill the 2 L bottle with ultrapure water and secure the Dosino with the 807 Dosing Unit on it.

Disconnect the 858 from its power source and plug the Dosino into MSB port 1 of the 858 Professional Sample Processor. Reconnect the Sample Processor to the power source.

Now connect the 807 Dosing Unit port 1 with an adapter (6.2744.080) and a capillary to the PEEK pressure screw (number 2 in the following graphic) on the Liquid Handling Station. Then use the Dosino to push water into the rinsing unit from below when needed. Here, it is recommended to install an I-Trap (6.1014.200) into the flow path of the water in order to remove any impurities that could have accumulated in the water reservoir. During the rinsing process, the inner tube of the rinsing unit is meant to be filled constantly with fresh ultrapure water so the aspiration needle can be thoroughly cleaned from the outside.

Please secure the PVC tubing (6.1801.120) to the disposal connector on the bottom of the Liquid Handling Station and lead its other end into a waste canister.



Number 4 in the picture above shows the attachment point of a capillary in case of a dilution feature, and number 1 indicates the rinsing entity.

The rinsing time program with the Liquid Handling Station works in a similar way to the one for rinsing with a special beaker: just move to the desired angle, go into work

position, and start the Dosino. Make sure to always dispose the waste in the external position 2.

4.2 Eluent Production Module

The 941 Eluent Production Module creates fresh new eluent out of eluent concentrate and ultrapure water. For installation instructions and further information, please refer to the 941 Eluent Production Module manual. The 941 can be connected to an ELGA flex ultrapure water system so that a continuous water supply can be guaranteed. The ELGA can be further integrated into the system as well for all the ultrapure water needs.

4.3 Alternative MSM rinsing and regeneration methods

For alternative suppressor rinsing and regeneration methods and setups, please refer to Application Bulletin 800105018EN.