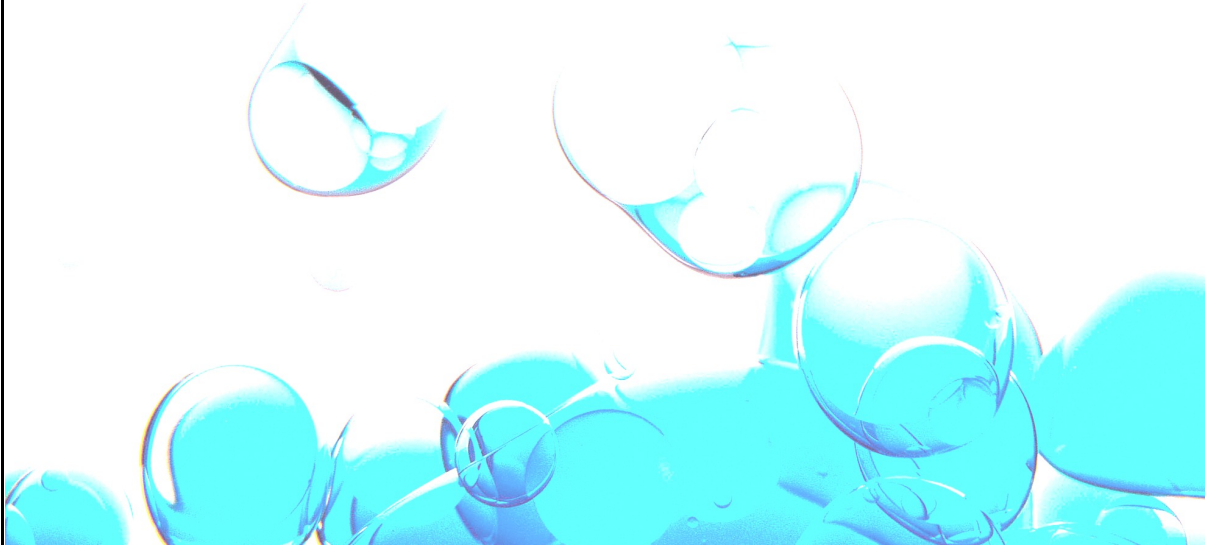
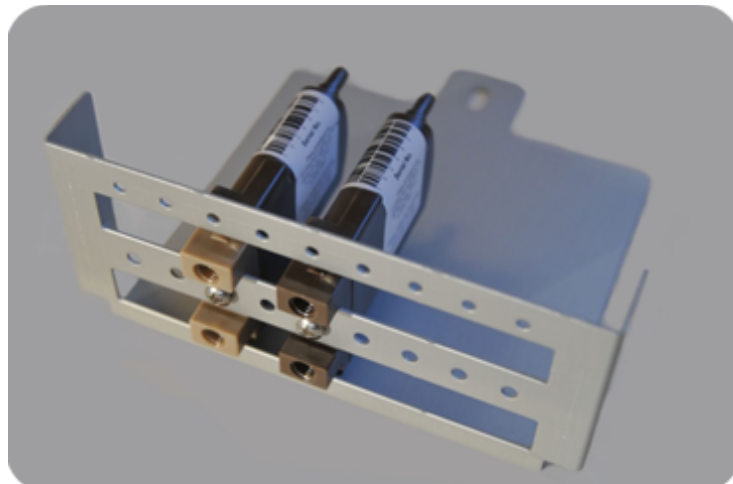


Installation Instructions
Waters Alliance upgrade kit
2690/2695/2790/2795



EVERYTHING FOR THE LAB

Title: Waters Alliance μ -Degasser Upgrade Kit

Technical Note # 9

Editor: Oliver Mueller / Henrik Ecke

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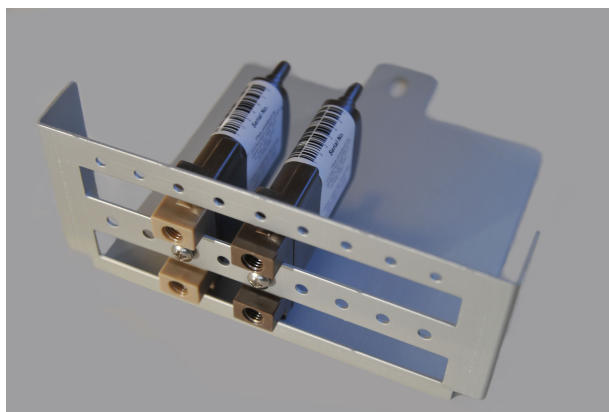
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1.0 Introduction

If your Alliance shows a "degasser hardware fault" error, the problem is related to the membrane vacuum pump or the degasser chamber. The degasser error occurs, if the degasser doesn't reach a sufficient vacuum after a specified time period or the pressure increases too much after pumping down. The electronic thinks there might be a leak. In those cases you have to check / replace degasser components. Those parts are relatively expensive from Waters but now, we offer a good alternative for reasonable price.



2.0 How does a degasser work

A degasser consists of an electronic circuit board, a vacuum pump, and each solvent has its own degasser chamber. The degassing process is done by a permeable membrane which is inside the chamber. The dissolved air can pass the membrane but the solvent stays inside the tube. The material is usually thin Teflon. Ten years ago Waters used a fluoropolymer that was less efficient. The degasser chamber was filled with a large coil of tubing.



Today, good degassing performance is achieved by using an amorph Teflon tube called Tefon AF. This material is widely used in the industry, for example coating optical parts.

The Tubing that is displayed on the right picture is only 1.5 feet long and has better performance compared to the old model with the large coil.



3.0 Precautions to operate a degasser

Because of the thin wall of the membrane, it is forbidden to pressurize the tube. If you try to purge the system by connecting a syringe to the chambers, you definitely destroy the membrane and your chamber leak. It is allowed to draw fluid through the chambers, but never pressurize!

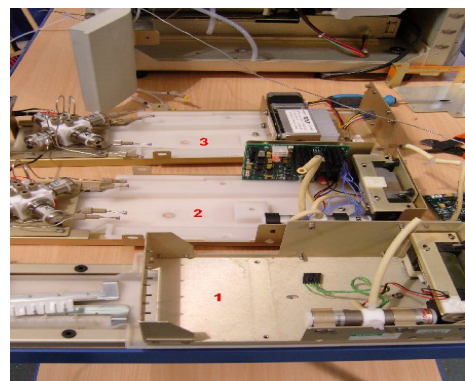
A second precaution is important, never use solvents that can dissolve Teflon. Fluorinated organic solvents should be avoided!

Maybe you recognized the clear Tygon tube that exit the degasser tray from the front. This tube is the exhaust line from the degasser pump. This tube should be placed in a fume hood. If you leave it on the table, the air goes in the room, but immissions are very little. It is a bad behaviour to but the tube in the waste bottle. The exhaust air will make bubbles and more solvent vapors enter the lab. If you switch the instrument off, the remaining vacuum may suck solvent back into the degasser pump and chambers! If your degasser components are wet they cause all kind of errors.

4.0 Different degasser trays

During the production of the Alliance, Waters changed some parts and redesigned the tray. There were three different trays build.

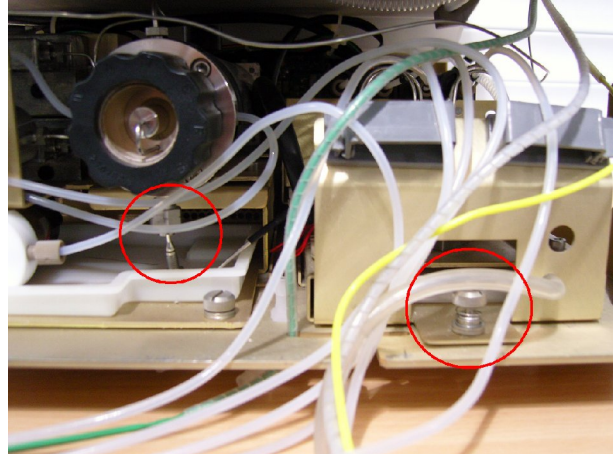
Our Upgrade is compatible with tray 2 and 3. Tray 1 was only used in very old Alliance systems. The difference is that the bracket of tray 1 is fixed by rivets, (no screws). You have to modify this to install the upgrade.



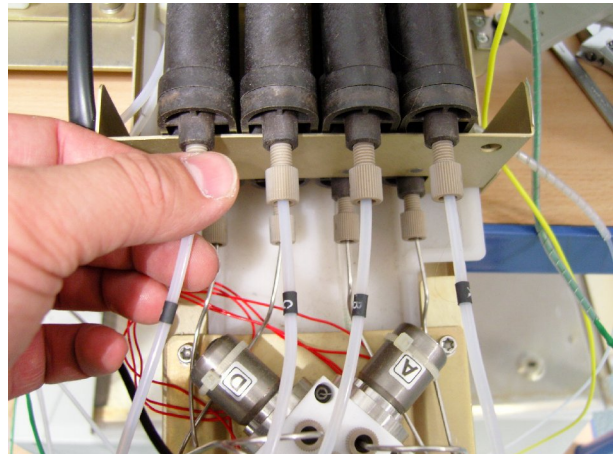
5.0 Installation of the μ -degasser

The installation is very simple. A non trained user can install the upgrade in less than 60min. The following pictures show exactly what you have to do.

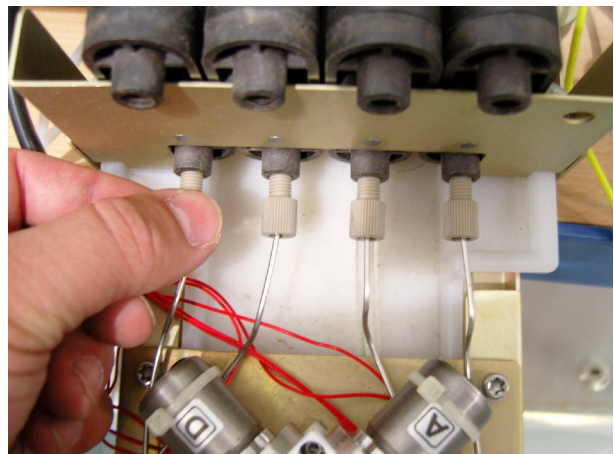
I. Loosen the solvent tray screw and the primary tube connection (red circle). If solvent is running out of the tube go to the Main Page in the Alliance display, browse Diag / OtherTests / Turn GPV off. Slide the solvent tray out of the module. Watch cables and tubings.



II. Disconnect the solvent lines from the degasser chamber. The lines are named D, C, B, A from left to right.



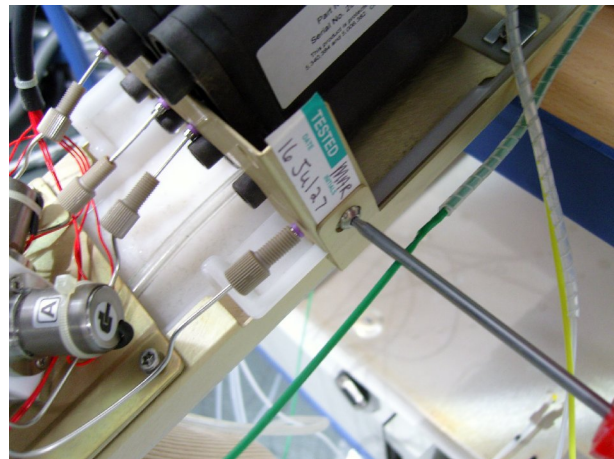
III. Disconnect the GPV tubings from the degasser chamber. The lines are named D, C, B, A from left to right.



IV. Loosen this Torx 10 screw.



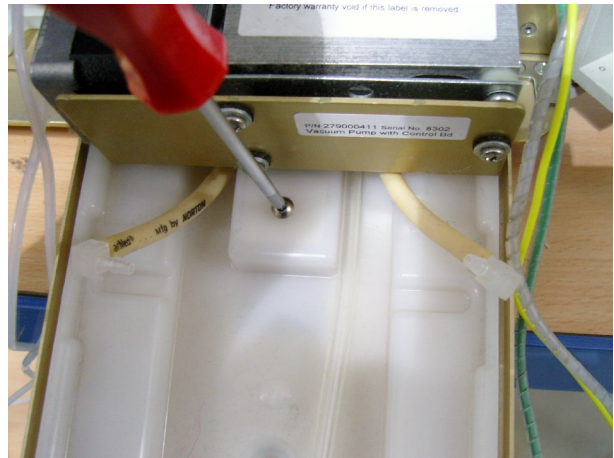
V. Loosen two Torx 10 screws The other one on the opposite side.



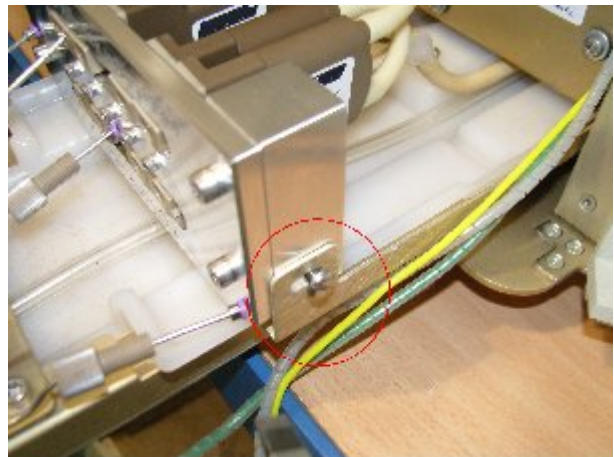
VI. Disconnect the degasser tubes from the 90° plastic union. The other union is on the opposite side. Remove the bracket which holds the degasser chambers.



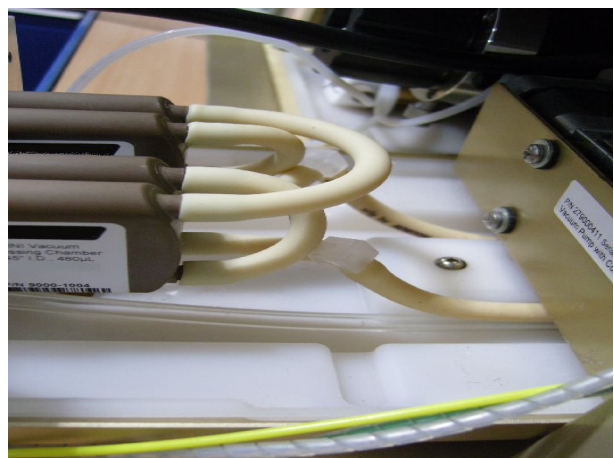
VII.Fasten the Torx 10 screw that hold the drip tray.



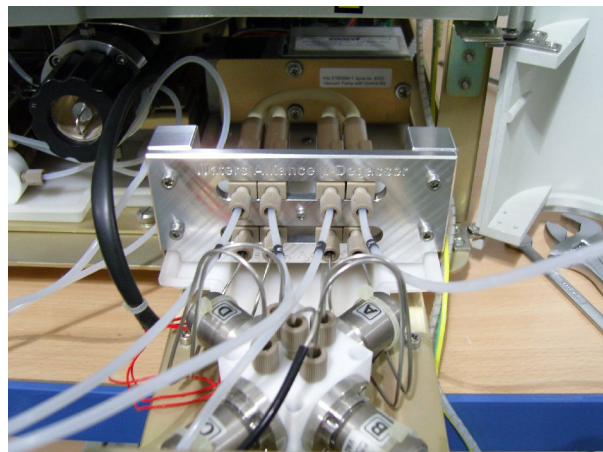
VIII. Install the bracket of your new μ -degasser. Tighten the M4x20 screw. The other one is on the opposite side.



IX. Connect the PharMed tubing from the degasser chamber with the 90° union.

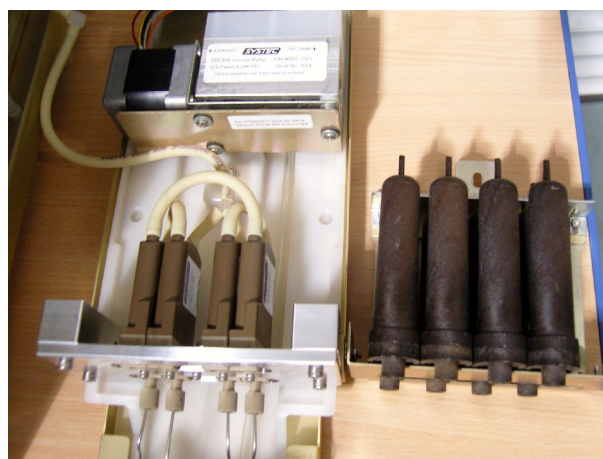


X. Connect all tubings. Slide the degasser tray back in place, you're done.



6.0 Performance of the μ -degasser

The picture show the original Waters degasser on the right and the μ -degasser on the left. The Waters part has much more internal volume. If you start the Alliance degasser with the Waters chambers, it takes between 90-120 seconds before it reach a vacuum of <60 mbar. With the μ -degasser this vacuum is achieved within 30 seconds! With the μ -degasser the vacuum is more stable (minimum leak rate), get rid of degasser errors. The Teflon AF tubing in the μ -degasser has a volume of 480 μ l per chamber. Degasser performance is equivalent / better compared to the standard Waters degasser. A similar small chamber stack is now used in the Acquity series. If you need very high degassing efficiency, we offer chambers with longer Teflon AF tubings. For GPC use there is a special chamber available. Use the table below as a reference. If you want, you can customize your own degasser.



Reference Number	Use	μ l of the degasser tube
9000-1004	Analytical 2ml/min	480
9000-1006	Analytical 3ml/min	670
9000-1009	Analytical 4ml/min	925
9000-1184	Analytical GPC Applications 2ml/min	480