

nanoACQUITY UPLC System

Solvent Stabilization Kit Instructions

Contents:

Topic	Page
Materials and tools required	1
Installing the solvent stabilization kit	2
Making the solvent connections	3
Making the gas connections	5
Operation	7
Troubleshooting	9
Solvent stabilization kit on solvent tray	11

This kit modifies a nanoACQUITY UPLC[®] system that includes a mass spectrometer so that you can sparge or blanket solvents with helium.

See also: *nanoACQUITY UPLC System Operator's Guide* and the MassLynx online Help.

Materials and tools required

- Helium source (highest purity) with a regulated output between 90 and 100 psi
- One or two solvent bottles, up to a maximum volume of 1 L, with GL45 DIN thread, per ISO 4796



Warning: This kit is designed for use with solvent bottles no larger than 1000 mL.

- Phillips[®] screwdriver
- Razor knife

Installing the solvent stabilization kit

The regulator assembly mounts on the right-hand rail of the solvent tray.

See also: “Solvent stabilization kit on solvent tray” on page 11



Warning: To prevent injury, always observe Good Laboratory Practices when you handle solvents, change tubing, or operate the system. Know the physical and chemical properties of the solvents you use. See the Material Safety Data Sheets for the solvents in use.



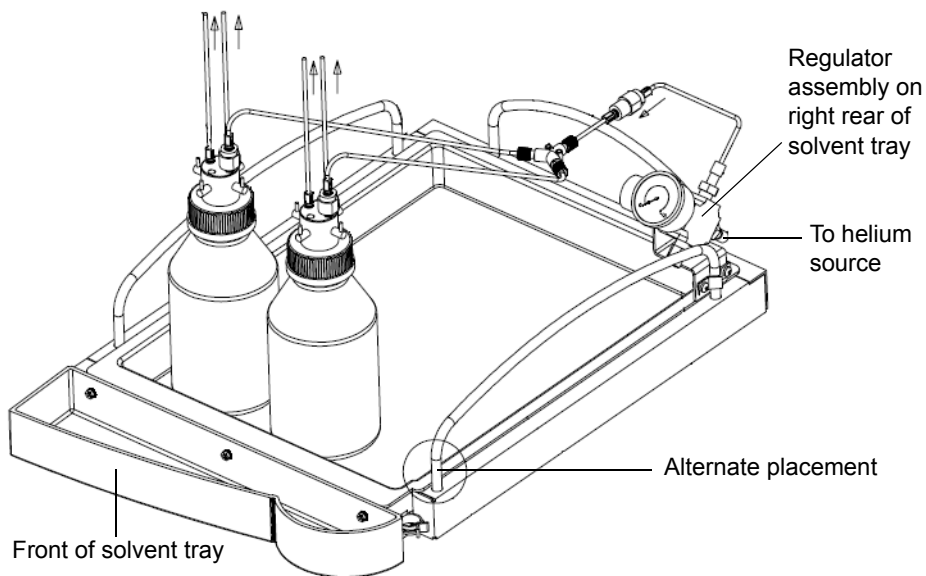
Caution: To avoid contaminating the system with skin oils, powder, or other contaminants, always wear powder-free, sterile gloves when handling the tubing, fittings, and other system components.

See also: *Controlling Contamination in UltraPerformance LC/MS and HPLC/MS Systems.*

To attach the regulator assembly to the solvent tray

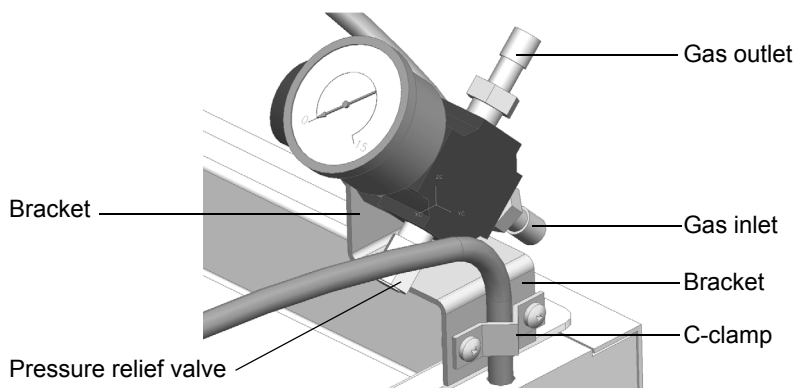
1. Locate the regulator assembly on a vertical part of the right-hand rail of the solvent tray.

Recommended locations



2. To mount the regulator, remove one screw from the C-clamp, and swing the clamp out of the way.

Attaching the regulator to the solvent tray



3. Holding the C-clamp on the outside of the rail and the bracket on the inside, attach the bracket and C-clamp using the two screws.

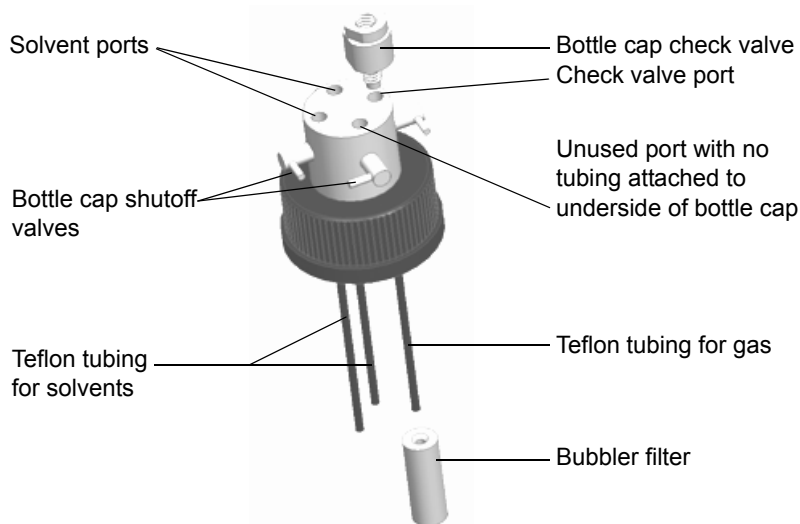
Making the solvent connections

To make the solvent connections:

1. Determine the volume of the solvent bottles.
 - If you use 1000-mL bottles, proceed to step 2.
 - If you use 500-mL bottles, trim approximately 10 cm (4 inches) from the end of each of the three Teflon tubing lines under the bottle caps. If later required, you can replace the lines using 1/8-inch OD × 1/16-inch ID Teflon tubing.
2. On a bottle cap, select one of the three ports to which tubing is attached, and install a check valve on the top of the cap, securing it finger tight.

Restriction: The bottle caps have four ports. Three ports have tubing attached to the underside of the cap. The fourth port does not have tubing attached to its underside and must remain unused. This port allows you to switch between sparging and blanketing.

Installing the bubbler filter and check valve



3. Slide the bubbler filter onto the tubing that connects to the check valve port. Ensure the bubbler filter and the check valve are attached to the same port on the bottle cap.
4. Remove the solvent filters from the ends of the tubing connected to the solvent inlets in the solvent manager.
5. Slide the solvent filters onto the ends of the tubing connected to the solvent ports.
6. Connect the solvent tubing from the solvent manager to the solvent ports on top of the bottle cap.
7. Cut the bottle netting to a length equal to the bottle height:
 - 500-mL reservoir: approximately 17 cm (6.5 inches)
 - 1000-mL reservoir: approximately 22 cm (8.5 inches)
8. Slide the netting over the bottle neck and downward toward the base.

Rationale: The protective polyethylene netting prevents the bottles from surface damage. The netting is suitable for 500- and 1000-mL bottles that are less than 10 cm (4 inches) in diameter.
9. Repeat steps 1 through 8 for the second bottle.
10. Screw the cap assemblies onto the bottles.

Making the gas connections

To make the gas connections:

1. Cut a section of tubing 13 to 15 cm (5 to 6 inches) long, and connect it between the gas outlet of the regulator assembly and the in-line check valve.

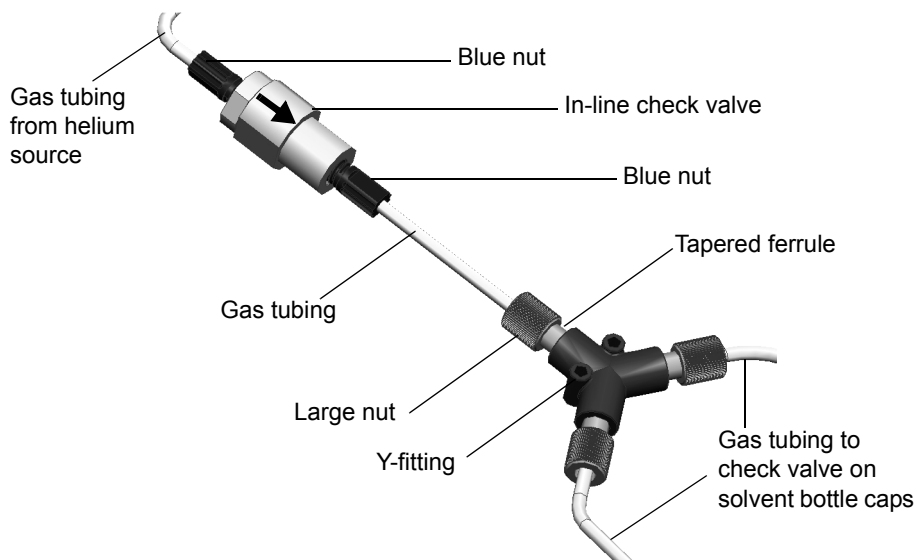
Tip: The check valve uses the blue nut and clear tapered ferrule.

Requirement: The arrow on the check valve indicates the direction of gas flow. Install the check valve with the arrow pointing away from the regulator. Otherwise, helium cannot flow to the solvent bottles.

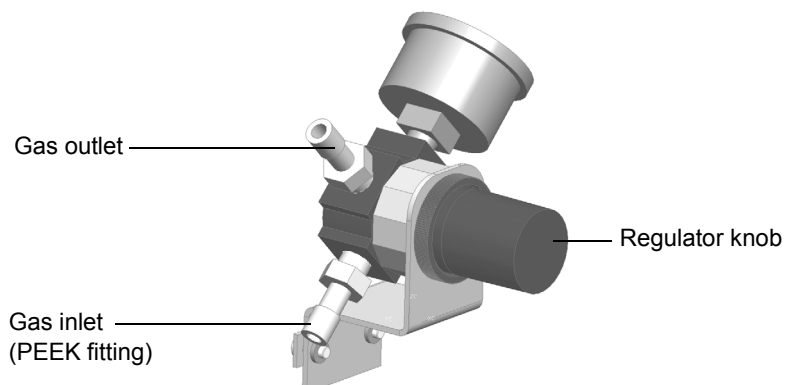
2. Cut a section of tubing 5 to 7 cm (2 to 3 inches) long, and connect it between the in-line check valve and the Y-fitting, as shown below.

Tip: The Y-fitting uses tapered ferrules and large nuts.

Y-fitting connections



Regulator connections

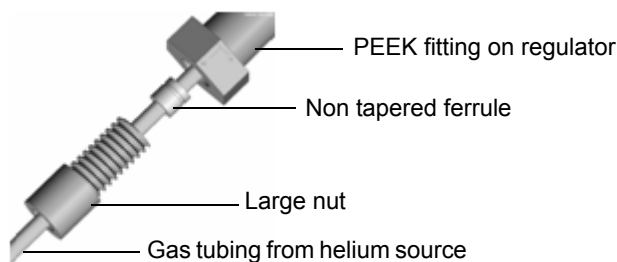


Warning: For safety reasons, the pressure is set to approximately 4.5 psi. If tampering occurs, the pressure relief valve can open.

3. Cut a section of tubing 46 to 51 cm (18 to 20 inches) long, and connect it between the Y-fitting and the bottle cap check valve. Repeat for the second bottle.

Requirement: Make the connections at the regulator assembly using the PEEK fittings and non tapered ferrules, as shown below.

Regulator connections



4. Attach the helium source to the gas inlet of the regulator assembly.

Alternatives: If needed, use the balance of gas tubing supplied in the kit to connect the regulator to the helium source. To accommodate various helium sources, this kit includes a 1/8-inch NPT fitting and a 1/8-inch to 1/4-inch bushing. Use a non tapered ferrule.

5. Visually inspect the connections on the bottle caps to ensure that these conditions are met:
 - The gas supply lines from the Y-fitting are connected to the check valve on each bottle cap, which is in line with the bubbler filter.
 - All solvent supply lines are connected to ports that have tubing with solvent filters in the bottles.
 - The port with no tubing is unused.

Operation



Caution:

- The in-line check valve prevents solvent from flowing back to the regulator. Before operating the system, verify that all lines are free of liquid.
- To ensure proper operation, the helium source pressure must be between 90 and 100 psi.
- The valve at the check valve on the bottle cap serves as a disconnect between the helium source and the solvent system. When filling the solvent bottles or changing the helium source, close this valve.
- When initially supplying helium to the regulator assembly, close the bottle cap shutoff valves, and reopen them only after you open the helium source valve.

To operate:

1. Open the helium source. Ensure that the pressure is between 90 and 100 psi.
2. Open the bottle cap shutoff valves to sparge the solvents.

See also: [“To sparge the solvents:” on page 8.](#)

3. To blanket the solvents, close the shutoff valve for the port that has no tubing attached to the underside of the bottle cap.

See also: [“To blanket the solvents:” on page 9.](#)

To add solvents to the bottles:

1. Ensure that the solvent flow is stopped.
2. Close all bottle cap shutoff valves (horizontal position).

Tip: Each bottle cap has four ports. Fitted to each port is an independent-acting shutoff valve. When the valve handle is horizontal, the integral cap valve is closed. When the handle is vertical, the shutoff valve is open.

3. Remove the cap assembly from the bottle.
4. Fill the bottle with solvent.
5. Screw the cap assembly onto the bottle.
6. Open all bottle cap shutoff valves.
7. Sparge the solvent.

See also: “To sparge the solvents:” on page 8.

8. Blanket the solvent.

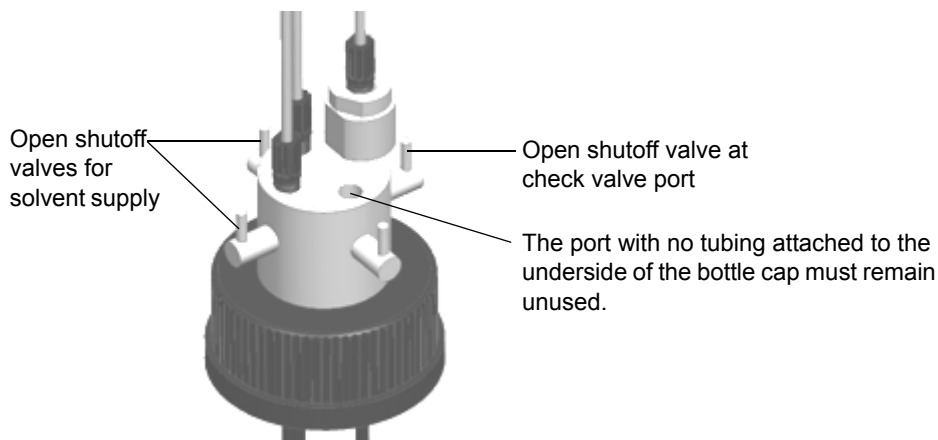
See also: “To blanket the solvents:” on page 9.

9. Start the solvent flow.

To sparge the solvents:

1. Ensure that the helium source is between 90 and 100 psi.
2. Open all bottle cap shutoff valves.

Bottle cap valves during sparging



To blanket the solvents:

1. Ensure that the helium source is between 90 and 100 psi.
2. Close the shutoff valve at the unused port (horizontal position), and ensure that all the other port valves are open.

To replace the helium source:

1. Ensure that the solvent flow is stopped.
2. Close all bottle cap shutoff valves (horizontal position).
3. Disconnect the gas tubing from the depleted helium source.
4. Connect the gas tubing to a source of helium.
5. Ensure that the helium source pressure is between 90 and 100 psi.
6. Open the bottle cap shutoff valves to sparge the solvents.
7. To blanket the solvents, close the shutoff valve at the port that has no tubing attached to the underside of the bottle cap.

Troubleshooting



Warning: For safety reasons, do not adjust the regulator. It is factory-adjusted to the optimum setting.



Caution: If the internal pressure rises above the default value (approximately 4.5 psi), the pressure relief valve partially opens. At approximately 10 psi, the pressure relief valve allows 100% venting.

Symptom	Possible cause	Solution
Gas is consumed too quickly	Leaks from the gas connections or tubing	Use a leak detector such as snoop [®] to detect any leaks in the gas connections or tubing.
	Excessive sparging; regulator setting accidentally increased	Adjust the regulator to the required 4.5 psi.
Hissing from pressure relief valve (Pressure relief valve goes to 100% venting at about 10 psi, which is about twice the default setting.)	Regulator setting accidentally increased	Adjust the regulator to the required 4.5 psi.
No gas flow	Bottle cap shutoff valve at check valve port closed	Open bottle cap shutoff valve at check valve port.
	Helium source turned off or depleted	Ensure that the helium source pressure is between 90 and 100 psi. Replace helium supply.
	Regulator accidentally decreased	Adjust the regulator to the required 4.5 psi. Ensure that the helium source pressure is between 90 and 100 psi.
Unable to sparge	Unused shutoff valve on cap closed	Open unused shutoff valve on bottle cap.
	Helium source empty	Replace helium source.

Solvent stabilization kit on solvent tray

Suggested installation layout

