



Vector PCX

Preventative Maintenance

Maintenance Schedule



- Routine Maintenance
 - Check for leaks daily. Fix any leak immediately.
 - Replace the piston wash solution every week.
 - Record operating pressures for each sequence.
 - If there is a dramatic increase in pressure, determine the cause of the increase. Replace the blockage, replace filters or flush system with 80/20 Water/MeOH mixture.
- Preventative Maintenance
 - Replace pump seals every 12 months
 - Replace the 10um and 0.5um frits every 3 months or when you notice a pressure increase of 200 psi.
 - Change the heated reactor every 24 months

Required Tools



- 5/32" Hexdriver
- Seal Insertion and Removal Tool
- Tweezers
- Philips Head Screwdriver
- 7/16" Wrench
- 3/32" Hexdriver
- 3/4" Wrench



PM Kit

PN 1000-1006 Vector PM Kit, Dual Pump

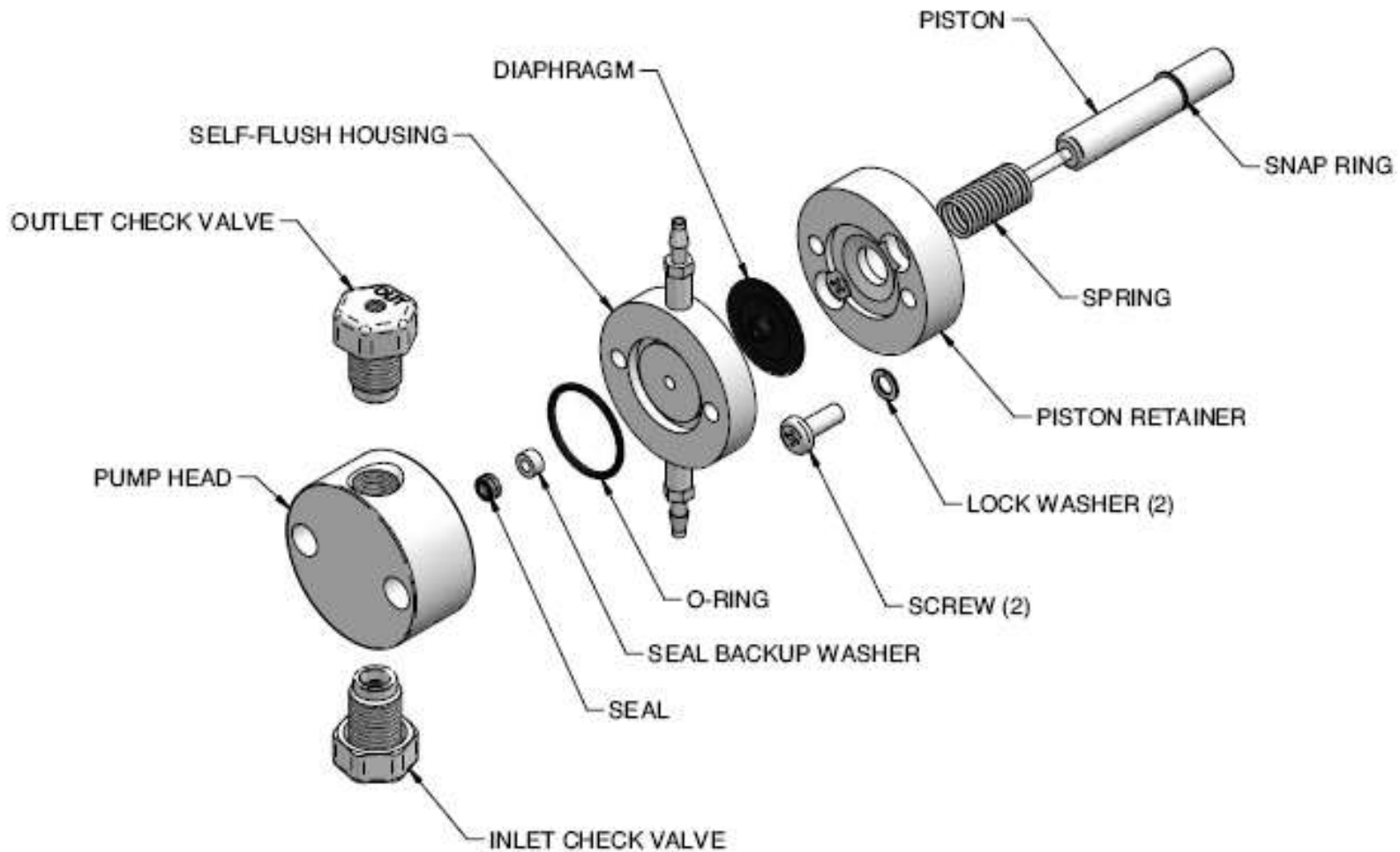
Contains pump seals, reagent filters, pre-flow restrictor filters, flow restrictors (PN 1100-0200), tubing, nuts, and ferrules for a dual pump system with OPA flow restrictors.

Pump Maintenance



- Replace your reagent with 80 Water/20 Methanol.
- Start your HPLC flow so you can Enable the Vector.
- Enable the Vector and then set the heated reactor temperature all the way down to OFF.
- Turn on the reagent pumps and flush them with water/methanol for at least 30 minutes.
- After flushing, turn off the HPLC pump and this will in turn stop the Vector system.
- Power down the Vector and remove the reagent line from the inlet of the reagent pumps.

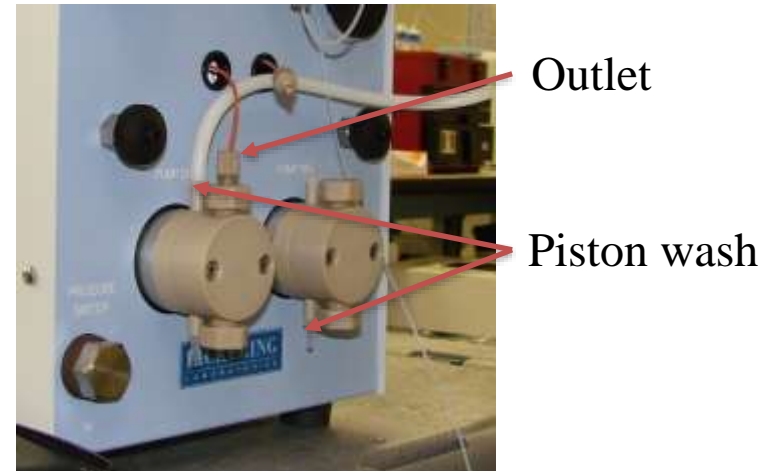
Pump Maintenance



Removing the Pump Head



- Remove the outlet line from the outlet check valve.
- Remove the piston wash line.
- Using a 5/32" Hex driver, loosen the two screws at the front of the pump head.
- **CAUTION:** Be careful not to break the piston when removing the pump head. Twisting the pump head can cause the piston to break.



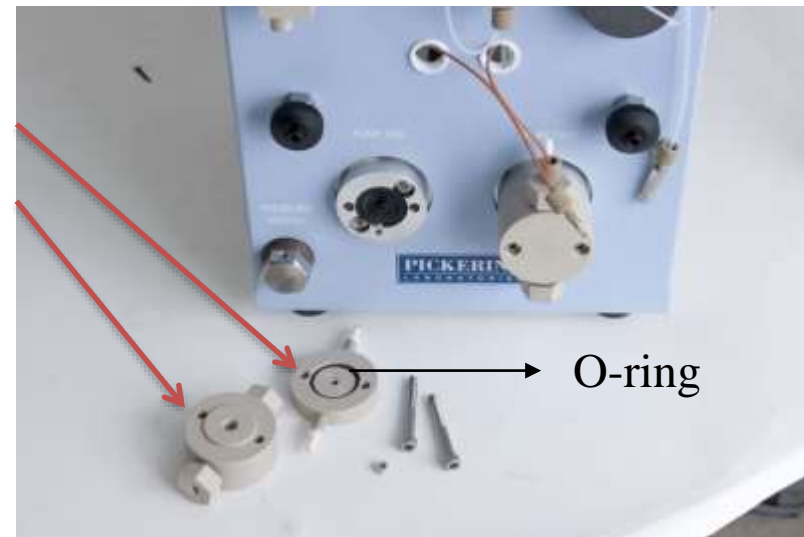
Removing the Pump Head



- Carefully separate the pump head and the flush housing from the pump. Pull straight out from the pump and remove both units from the piston.
 - Be careful not to break or damage the piston.
- Remove the O-ring.
- Use tweezers to remove the diaphragm.



Flush Housing
Pump Head



Replacement Seal Kit

Each replacement seal kit contains:

- a pad to clean the piston when changing the seal
- a seal insertion/removal tool
- seal
- Backup washer
- O-Ring
- diaphragm



Cleaning the Pump Head Assembly



- The pump head, check valves, and flushing housing may be further cleaned using a laboratory grade detergent solution in an ultrasonicating bath for at least 30 minutes, followed by rinsing for at least 10 minutes in distilled water.
- Be sure that all particles loosened by the above procedures have been removed from the components before reassembly.
- **CAUTION:** When cleaning check valves, be sure that the ball is not against the seat in the ultrasonic bath. This may destroy the precision matched sealing surface and the valve will not check.

Cleaning the Piston

- Clean the Piston to remove any salt build up or dirt. If there is a lot of build-up, clean the piston using the scouring pad as described below. Otherwise, use a lint-free cloth dampened with alcohol to wipe the piston clean.
- It is not necessary to remove the piston from the housing to clean the piston.

To Clean the Piston using the Scouring pad:

- Use the scouring pad included in the seal replacement kit. Gently squeeze the piston within a folded section of the pad and rub the pad along the length of the piston.
- Rotate the pad frequently to assure the entire surface is scrubbed.
- Do not exert pressure perpendicular to the length of the piston, as this may cause the piston to break.
- After scouring, use a lint-free cloth, dampened with alcohol, to wipe the piston clean.

Piston Replacement



- Only replace the Piston if there are major scratches.
- With your thumb pressing the piston retainer against the pump housing, remove the two phillips head screws from the retainer. Do not allow the spring pressure to force the retainer away from the housing as the screws are loosened.
- After both screws have been removed, slowly allow the spring pressure to push the retainer out of the housing.
- Gently pull the retainer straight out and carefully remove it from the piston and threaded rods. Also, gently pull the spring straight out of the housing and remove.



Piston Replacement

- Grasp the metal base of the piston assembly so that you avoid exerting any pressure perpendicular to the length of the piston, and gently pull it from the pump housing.
- Use a small screwdriver to remove the snap ring from the groove on the old piston and place it into the groove on the new piston.
- Place a small amount of high quality lightning grease on the back end of the metal base of the piston assembly.
- Grasp the metal base of the piston assembly near the front so that you avoid exerting any pressure perpendicular to the length of the piston, and gently slide it into the pump housing.
- Gently slide the spring over the piston assembly and back into the pump housing.

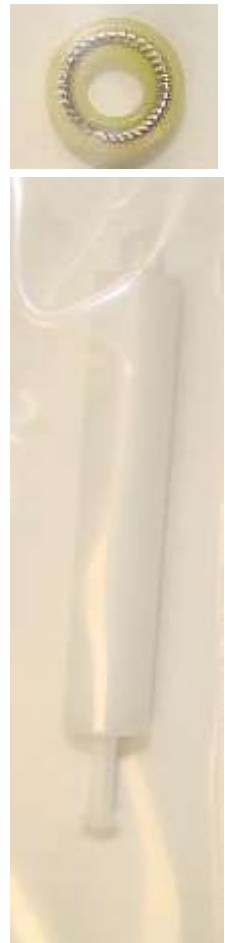
Piston Replacement



- Carefully align the retainer and gently push it straight in against the spring force until the retainer is against the housing. If misalignment with the piston occurs, wiggle while pushing the retainer to align the piston & retainer.
- Hold the retainer flush against the housing with your thumb.
- Insert and tighten the phillips head screws. Do not allow the spring pressure to force the retainer away from the housing. Insure that there are no gaps between the retainer and the housing.

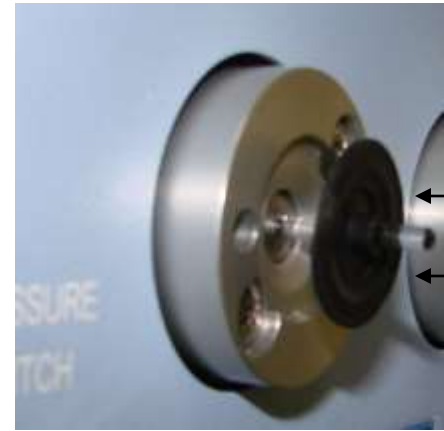
Rebuilding the Pump Head Assembly

- Place a replacement pump seal on the rod-shaped end of the seal insertion/removal tool so that the spring is visible when the seal is fully seated on the tool.
- Insert the tool into the pump head so that the spring side of the seal enters first. Be careful to line up the seal with the cavity while inserting. Then withdraw the tool, leaving the seal in the pump head. The spring should not be visible when you look into the pump head cavity.



Rebuilding the Pump Head Assembly

- Gently place the diaphragm onto the piston with the center hub protruding towards you. Push the diaphragm all the way back into recess and against metal base of piston. Do not exert pressure perpendicular to the length of the piston, as this may cause the piston to break.
- Place the new O-ring in the groove of the flush housing unit.



Rebuilding the Pump Head Assembly

- Carefully align the flush housing unit and the pump head and gently slide both into place on the pump. Make sure that the Inlet valve is on the bottom and the Outlet valve is on the top.
- Tighten both hex screws in the pump head using the 5/32" hex driver. **DO NOT over tighten!**
- Reattach the inlet and outlet lines.
- Reattach the piston flush lines.



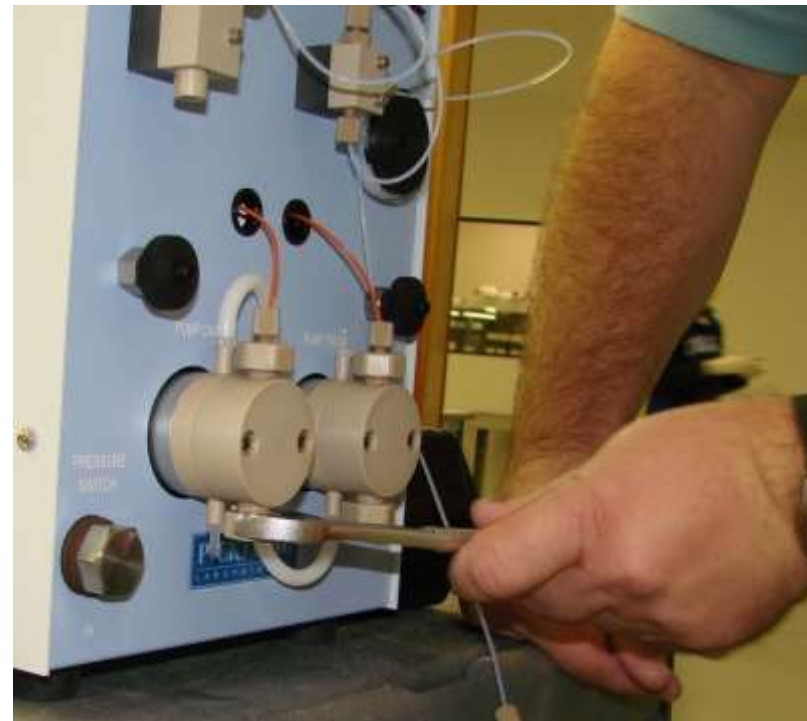
Check Valve Maintenance

- Each check valve assembly contains two capsules. Pay attention to the flow direction. Each capsule has an arrow indicating the flow direction.
- Many check valve problems are the result of small particles interfering with the operation of the check valve.
- As a result, most problems can be solved by pumping a strong solution of liquid laboratory grade detergent through the check valves at a rate of 1 ml/min for one hour.
- After washing with detergent, pump distilled water through the pump for fifteen minutes.
- **Always direct the output directly to a waste beaker during cleaning.**
- **If this does not work, the check valve should be replaced.**



Check Valve Maintenance

- If the check valves have been removed, tighten each check valve to 12.5 inch-pounds.
- This is usually done by tightening each check valve by hand, then using a torque wrench. If there is a leak, tighten to 13-14 inch-pounds, but NEVER above 15 inch-pounds.
- If no torque wrench is available, tighten each check valve no more than 1/8 turn past finger tight.
- DO NOT over tighten the check valve assembly as this will deform the seal and it will not work properly.



Reagent Filter Replacement



- The reagent filters are located in each of the mixing manifolds.
- When there is an increase in the reagent pressure, it is usually an indication that the reagent filter should be replaced.
- The reagent filters are a 10um frit inside a PEEK housing. They are disposable and cannot be cleaned.



Reagent Filter Replacement



- Using a 7/16" wrench, loosen and remove the old filter.
- Replace the 10 um filter (PN 3102-9040). Hand tighten first, then give a ¼ turn with a 7/16" wrench.

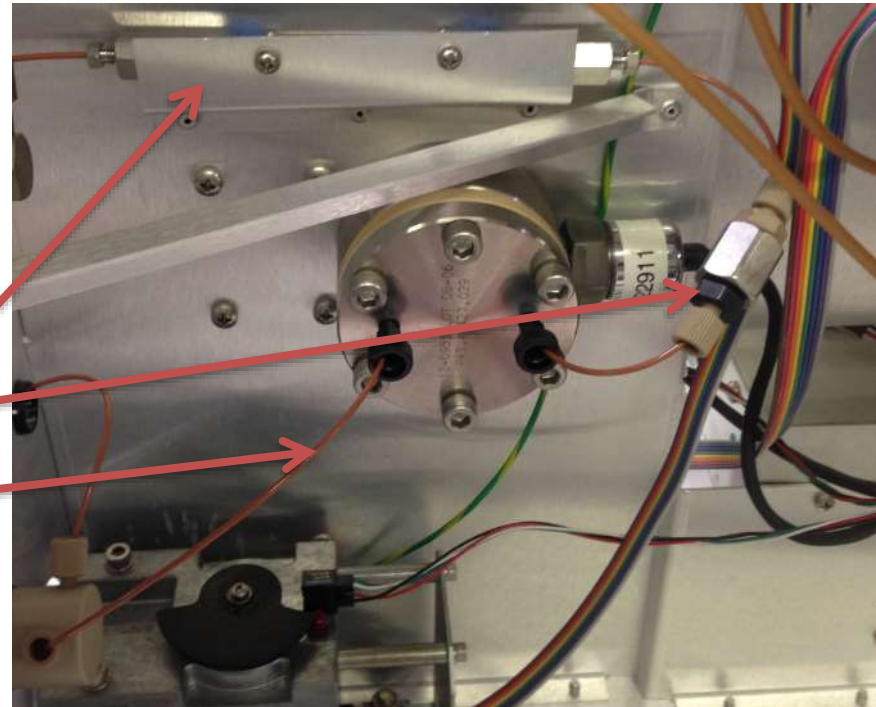


Flow Restrictors



Replace the old flow restrictors with new ones provided in the PM kit. At this time you can also replace the 0.5um pre-flowrestrictor filters and accompanying tubing.

Flow Restrictor
0.5um Filter
Tubing

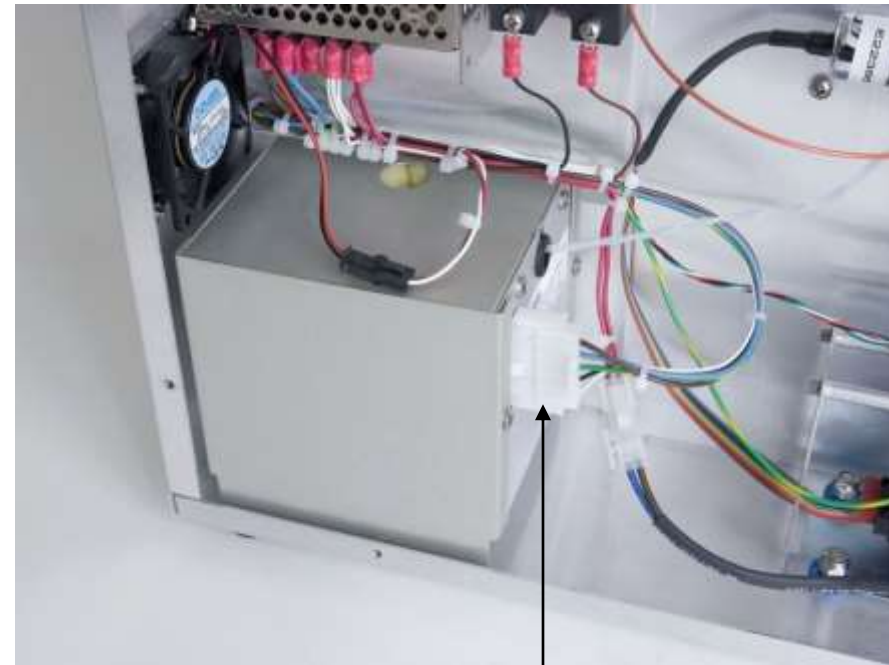


Heated Reactor Replacement



Replace the heated reactor every 2 years or whenever there is a blockage.

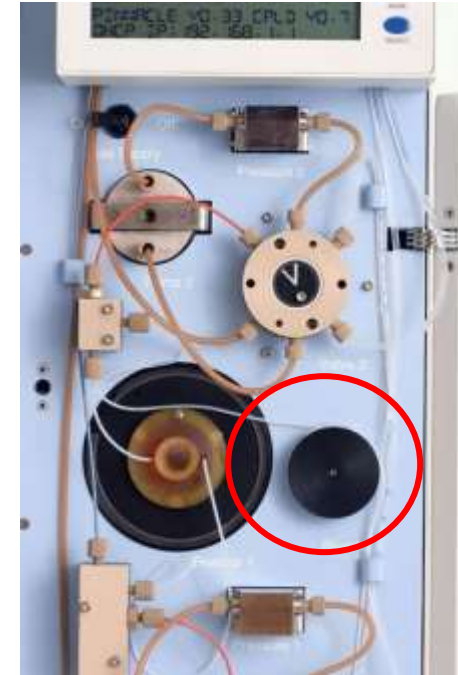
- Remove the inlet and outlet tubes.
- Remove the three Phillips head screws that hold the heated reactor onto the chassis. These are accessible from the right side of the system.
- Unplug the white cable harness by squeezing on the two tabs and the pull out.
- Replace with a new heated reactor using the above steps in reverse.



White cable harness

Ambient Reactor Replacement

- Only replace if the ambient reactor is clogged.
- Disconnect the LiteTouch fittings at both ends of the ambient reactor. These will be located on the manifold and the inlet of the detector.
- Loosen the screw that holds the black spindle to the fluidics panel with a 3/32" Alan wrench.
- Remove the spindle and remove the used reactor.
- Slide the new reactor onto the spindle and fasten to the fluidics panel.
- Re-connect the LiteTouch fittings to the manifold and the union to the detector. Do not over tighten the fittings.



Set the Seals



- Power on the Vector.
- Make sure your Vector is properly connected to the HPLC detector.
- Turn on your HPLC pump in order to Enable the Vector.
- Turn on the reagent pumps at a flow rate of 1.0 mL/min for 60 minutes. This will break-in the new seals.
- Check for any leaks. You may need to use Needle Nose Pliers to tighten some fittings.

Pressure Test



- While the Vector is pumping flush solution, remove the connection to the detector and replace it with a blocked union. You will see the pressure increase to about 500 psi. The pressure shouldn't go higher than 500 psi due to the over-pressure relief valve.
- Stop the reagent pumps and allow the pressure to slowly drop to 450 psi.
- Set a timer for 10 minutes and measure the change in pressure. If the pressure drops more than 50 psi, the pressure test fails. Rebuild pressure and look for leaks.