

CombiFlash® Pump Seal Replacement Instructions

For NextGen 300, 300+, Rf, Rf200, Rf200i, Rf+, and Lumen



Instruction Sheet #69-5233-665
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Overview

This document will cover the pump seal replacement for the following CombiFlash systems: NextGen 300, 300+, Rf, Rf200, Rf200i, Rf+, and Lumen. These systems use two seals (P/N 605234270). Each section has its own set of instructions for replacing the pump seal for the different systems:

- See “Pump Removal Instructions for the NextGen 300 and 300+” on page 1.
- See “Pump Removal Instructions for the CombiFlash Rf+ and Lumen” on page 4.
- See “Pump Removal Instructions for the CombiFlash Rf, Rf200, and Rf200i” on page 7.

The pump seal should be replaced on a yearly basis or when the message suggesting the pump seals be replaced is displayed on the unit. Worn pump seals can potentially damage the pump if solvent leaks past the seal.

Safety

The use of Personal Protective Equipment is highly encouraged due to potential contact with residual solvents.

Tools

- 1/4" open end wrench
- 5/8" open end wrench
- 5/16" nut driver with a minimum shaft length of 3"
- 15/16" open end wrench or adjustable wrench
- Isopropyl Alcohol

Steps to Complete Before Starting Replacement

1. Place the pump pistons in the home position to be sure they are in the home position (top dead center). Turn the system OFF.
2. Wait 30 seconds for the unit to fully shut down.
3. Turn the unit ON and wait 30 seconds for the unit to fully boot up and home the pumps.
4. Shut the system OFF and now it is ready for service.

Pump Removal Instructions for the NextGen 300 and 300+

Removing the Pumps from the NextGen

Before the pump seals can be replaced, the pumps must be removed from the NextGen unit one at a time. The use of Personal Protective Equipment is highly encouraged due to potential contact with residual solvents.

1. Remove the side panel (7 screws).
2. Remove the rear cover (4 screws).
3. There is a check valve housing mounted to the top of each pump cylinder. **Do not remove the check valve housing from the cylinder.** Disconnect the PEEK fitting from the top of each check valve housing (Figure 1). Unscrew the 5/16" x 24 metal nuts from the bottom of each check valve housing (Figure 1).
4. Remove the two screws securing the solvent select valve to the back panel. **Do not disconnect the electrical connections to this valve.** This will allow the rear pump to be removed by manipulating the pump past the solvent selection valve (Figure 1).
5. With the 5/16" nut driver, remove the one top nut and loosen the bottom two nuts that attach the pump to the frame (Figures 1 & 2).

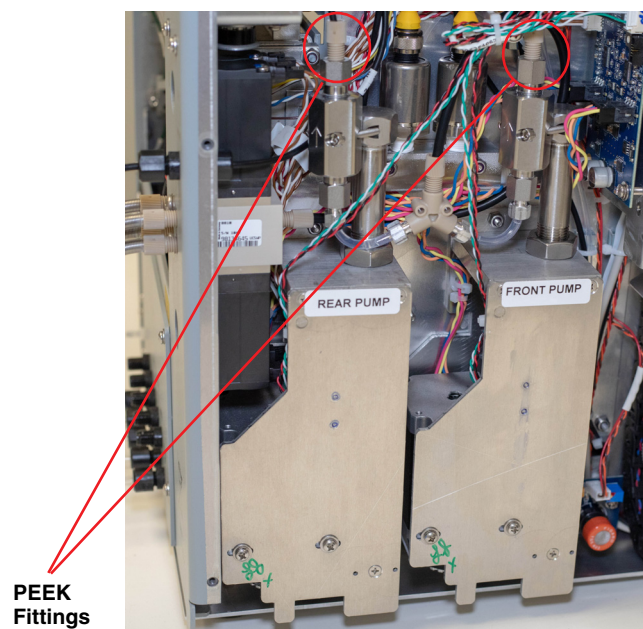


Figure 1: NextGen pumps

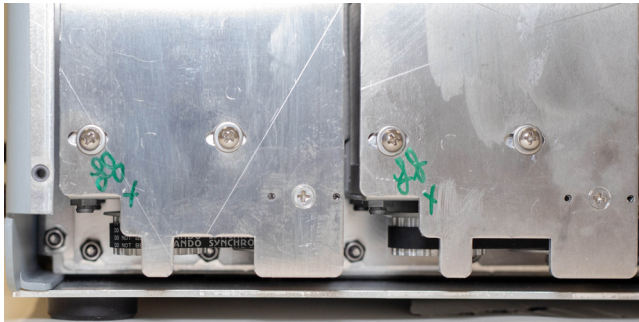


Figure 2: NextGen Pump mounting nuts (bottom)

6. To remove a pump, you must first remove the back panel to access the control board and disconnect the following cables:

Rear Pump	Front Pump
Sensor P7	Sensor P5
Motor P6	Motor P4

Note
Please keep in mind that there may be some cable ties that will need to be cut. Use great care not to sever any wires in the process.

7. Tilt the pump assembly out and lift up to remove, taking care not to damage the wires attached to the pump home sensor (Figure 3).

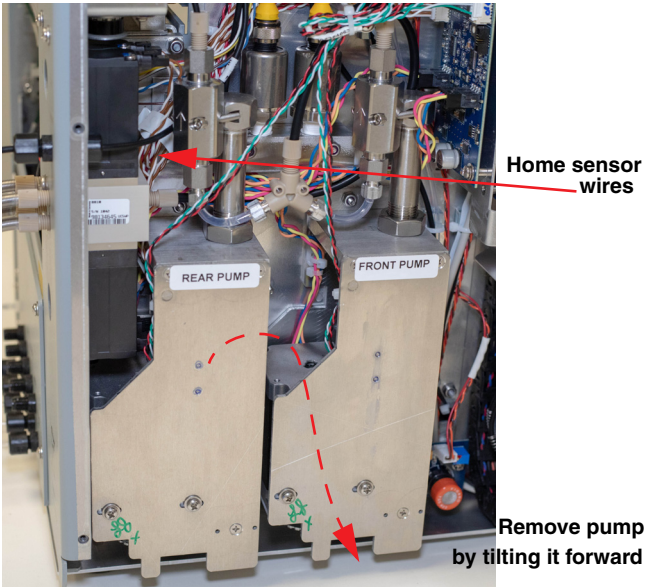


Figure 3: NextGen Pump removal

Replacing the Pump Seals

1. Take note of the direction the check valve housing is facing. Loosen the cylinder lock nut with an adjustable or $\frac{15}{16}$ " open end wrench.
2. Remove the cylinder using the $\frac{5}{8}$ " open end wrench.
3. Unscrew the piston retainer, which has flats to accommodate the $\frac{1}{4}$ " open end wrench.
4. Remove the old wear ring by peeling it apart at the diagonal cut (Figure 4).
5. Clean the piston with acetone, removing all traces of the old wear ring.

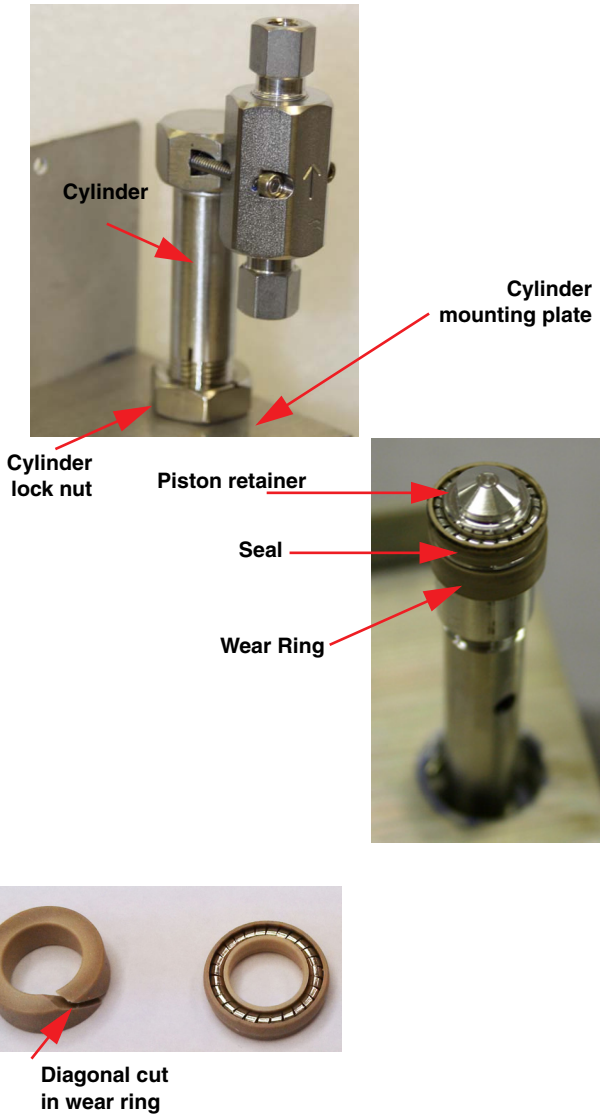


Figure 4: NextGen pump cylinder and seals

Installing the Seals

The following steps refer to Figures 5 & 6:

1. Install the seal on the retainer with the spring facing up.
2. Flex the new wear ring over the shaft and insert it into the groove.
3. Thread the assembled retainer and seal onto the piston and tighten using a $\frac{1}{4}$ " open end wrench.

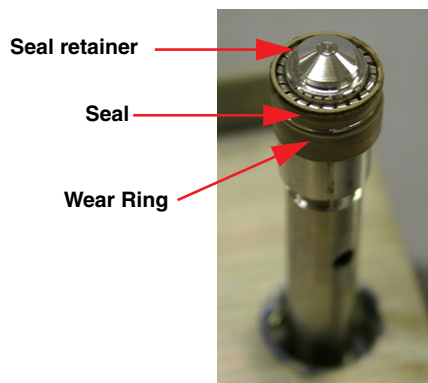


Figure 5: NextGen Install retainer with seals on piston

4. While the cylinder is removed, clean the cylinder inside diameter using IPA and a soft bottle brush. Swipe the length of the interior wall with a cotton swab; if any residue is on the swab, continue cleaning until none remains.
5. Before installing the cylinder, wet the seal with solvent to prevent seal damage.
6. Gently lower the cylinder over the piston.
7. Thread the cylinder assembly until it stops. Unscrew, up to one revolution, to align the check valve housing as it was before disassembly.
8. Tighten the cylinder lock nut (Figure 6).

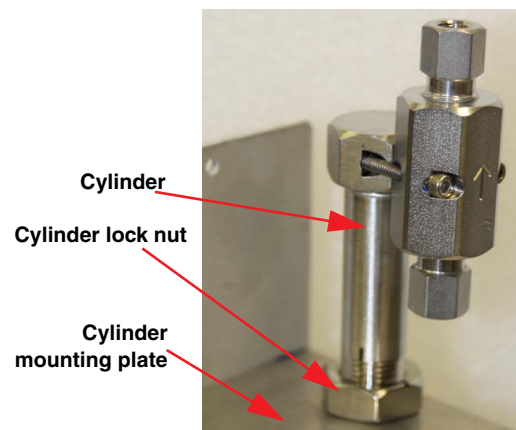
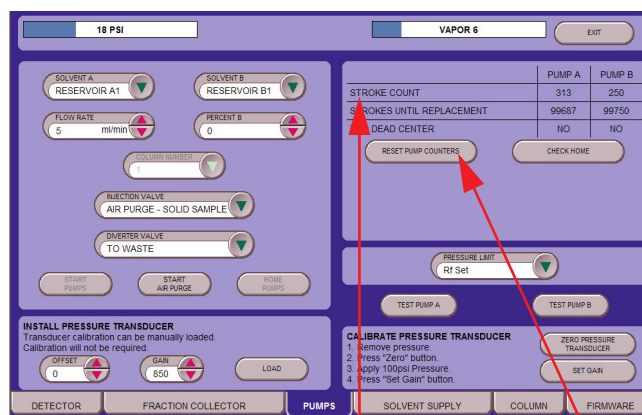


Figure 6: NextGen Pump cylinder with lock nut

Carefully reinstall the pumps by following the reverse steps that you used to remove them. Be sure to reconnect the pump motor and pump sensor electrical connections being sure no wires are caught behind the pumps.

9. Reconnect the tubing connections on the top and bottom of the check valve housings.
10. Remount the solvent selection valve.
11. Turn on the instrument.
12. Click on HELP then SERVICE to enter the service menu to reset the pump stroke count (Figure 7).



Stroke counts and
sensor verification

Pump counter
reset
button

Figure 7: NextGen Service menu: Pumps

13. Wearing eye protection, watch the pumps in action during a sample run to be sure there are no leaks either near the check valves or in the pumps near the motors. Once the work has been verified replace the side and rear panels.

Pump Removal Instructions for the CombiFlash Rf+ and Lumen

The Teledyne Isco CombiFlash® Rf+ has two internal pumps that need new pump seals at certain intervals. The Rf+ will display a message suggesting the pump seals be replaced. The seal uses a retainer with the 2 wrench flats. Worn pump seals can potentially damage the pump if solvent leaks past the seal. When ordering the seals for CombiFlash Rf+ order a quantity of two (2) PN 60-5234-267, one for each pump.

Removing the Pumps

Before the pump seals can be replaced, the pumps must be removed from the Rf+ unit one at a time. The use of Personal Protective Equipment is highly encouraged due to potential contact with residual solvents.

Tools required:

- 1/4" open end wrench
- 5/8" open end wrench
- 5/16" nut driver
- 15/16" open end wrench or adjustable wrench
- Acetone

Removing the Pumps from the Rf+

1. Remove the side panel (7 screws).
2. Remove the rear cover (4 screws).
3. There is a check valve housing mounted to the top of each pump cylinder. **Do not remove the check valve housing from the cylinder.** Disconnect the PEEK fitting from the top of each check valve housing (Figure 1). Unscrew the 5/16" x 24 short nuts from the bottom of each check valve housing (Figure 1).
4. Remove the two screws securing the solvent select valve to the back panel. **Do not disconnect the electrical connections to this valve.** This will allow the rear pump to be removed by manipulating the pump past the solvent selection valve (Figure 1).
5. With the 5/16" nut driver, remove the one top nut and loosen the bottom two nuts that attach the pump to the frame (Figures 1 & 2).

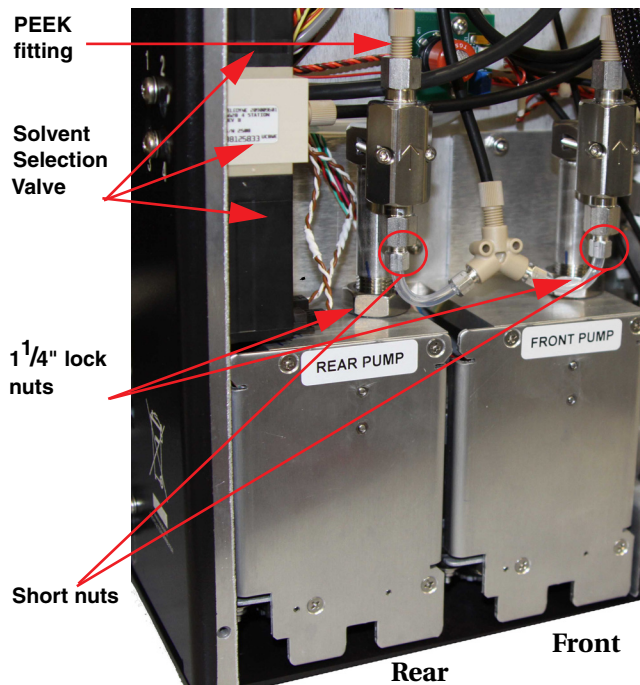


Figure 8: Rf+ pumps

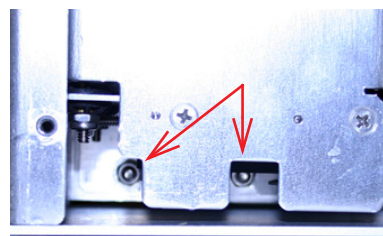


Figure 9: Pump mounting nuts (bottom)

6. To remove a pump, you must first remove the back panel to access the control board and disconnect the following cables:

Rear Pump	Front Pump
Sensor P17	Sensor P19
Motor P27	Motor P28

Note

Please keep in mind that there may be some cable ties that will need to be cut. Use great care not to sever any wires in the process.

7. Tilt the pump assembly out and lift up to remove, taking care not to damage the wires attached to the pump home sensor (Figure 3).

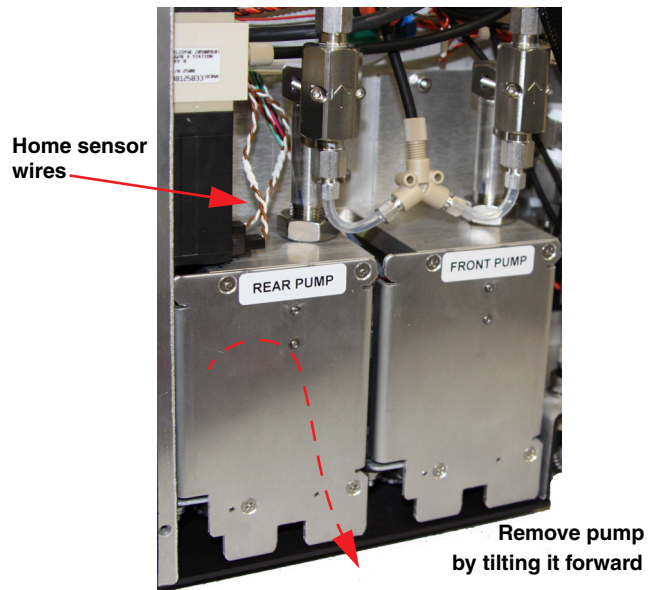


Figure 10: Pump removal

Replacing the Pump Seals

To access the pump seals:

1. Remove the pump as instructed in the *Removing the Pumps from the NextGen* section above.
2. Loosen the cylinder lock nut with an adjustable or $\frac{15}{16}$ " open end wrench.
3. Remove the cylinder using the $\frac{5}{8}$ " open end wrench.
4. Unscrew the piston retainer, which has flats to accommodate the $\frac{1}{4}$ " open end wrench.
5. Remove the old wear ring by peeling it apart at the diagonal cut (Figure 4).
6. Clean the piston with acetone, removing all traces of the old wear ring.

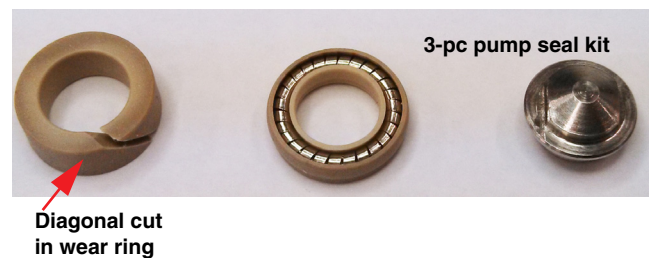
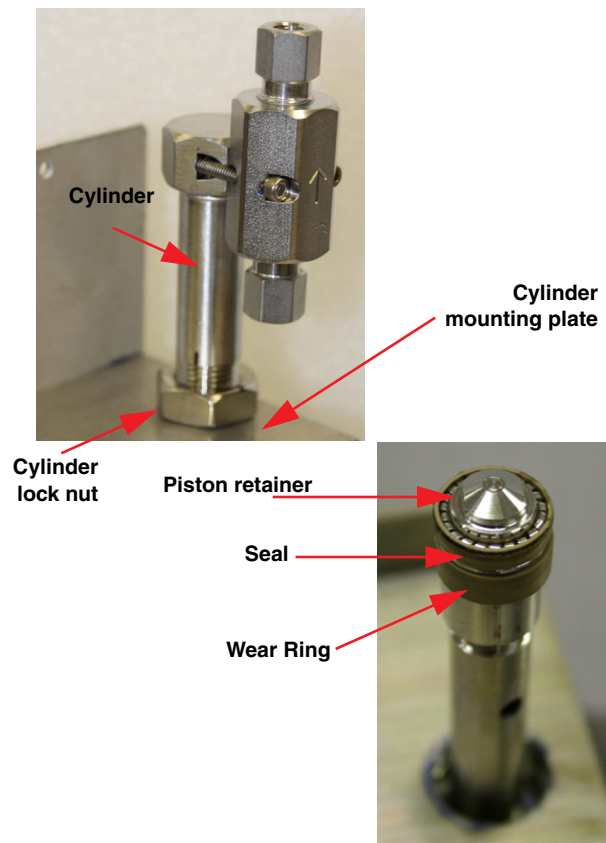


Figure 11: Pump cylinder and seals

☒ **Note**

If the pump seals are dark brown with an O-ring and the seal retainer has 6 flat edges as shown below, a new piston seal retainer part# 695233665 will be needed to install the new seals.



Obsolete brown seal with black O-ring and seal retainer with 6 flat edges.

Installing the Seals

The following steps refer to Figures 5 & 6:

1. Install the seal on the retainer with the spring facing up.
2. Flex the new wear ring over the shaft and insert it into the groove.
3. Thread the assembled retainer and seal onto the piston and tighten using a $\frac{1}{4}$ " open end wrench.

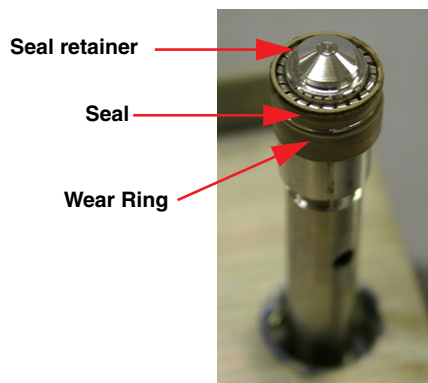


Figure 12: Install retainer with seals on piston

4. While the cylinder is removed, clean the cylinder inside diameter using IPA and a soft bottle brush. Swipe the length of the interior wall with a cotton swab; if any residue is on the swab, continue cleaning until none remains.
5. Before installing the cylinder, wet the seal with solvent to prevent seal damage.
6. Turn the pump on its side and rotate the gears until the piston is fully extended. Gently lower the cylinder over the piston while keeping the piston fully extended.
7. Thread the cylinder assembly until it stops against the piston. Unscrew, up to one revolution, to align the check valve housing as it was before disassembly.
8. Tighten the cylinder lock nut (Figure 6). Rotate the piston gears several turns so that the piston is no longer fully extended.

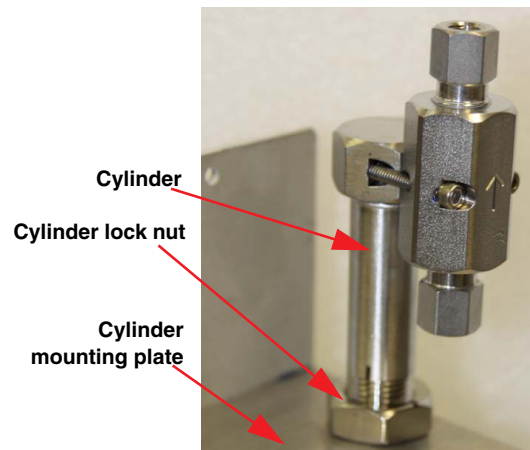
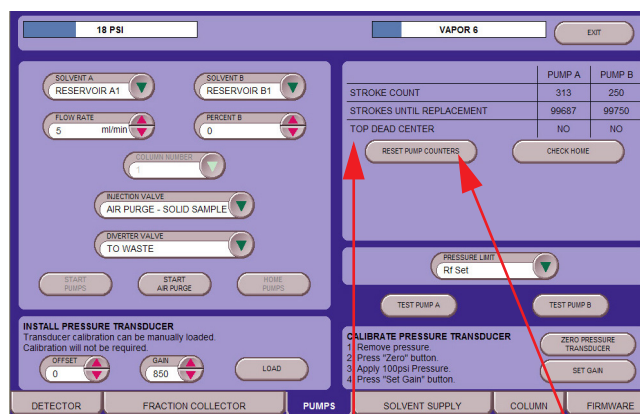


Figure 13: Pump cylinder with lock nut

9. Carefully reinstall the pumps by following the reverse steps that you used to remove them. Be sure that the small tabs on the sensor connectors face downward before inserting the connectors into P17 and P19 and that no wires are caught behind the pumps.
10. Reconnect the tubing connections on the top and bottom of the check valve housings.
11. Remount the solvent selection valve as was moved in step 4 (Removing the Pumps from the Rf+).
12. Turn on the instrument.
13. Click on **HELP** then **SERVICE** to enter the service menu to reset the pump stroke count (Figure 7).



Stroke counts and
sensor verification

Pump
counter
reset
button

Figure 14: Service menu: Pumps

Note

On rare occasions the pump(s) may produce a "squealing" sound, especially when pumping DCM. This sound is not detrimental to the operation of the pump or instrument.

14. Wearing eye protection, watch the pumps in action during a sample run to be sure there are no leaks either near the check valves or in the pumps near the motors. Once the work has been verified replace the side and rear panels.

Pump Removal Instructions for the CombiFlash Rf, Rf200, and Rf200i

Removing the Pumps from the Rf, Rf200, and Rf200i

1. Remove the side panel (7 screws).
2. Remove the rear cover (4 screws).
3. Disconnect the PEEK fitting from the top of the pump cylinder (Figure 1).
4. With the 5/16" nut driver, remove the top two nuts and loosen the bottom two nuts (Figure 15 & 16) retaining the pump.

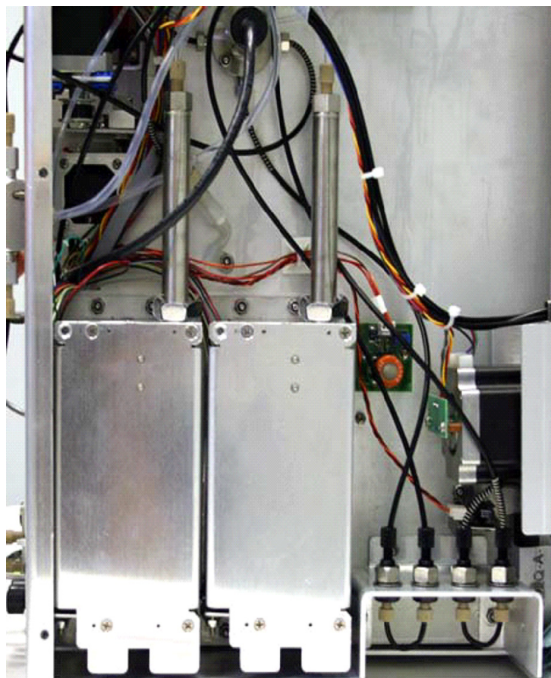


Figure 15: Rf pumps A & B

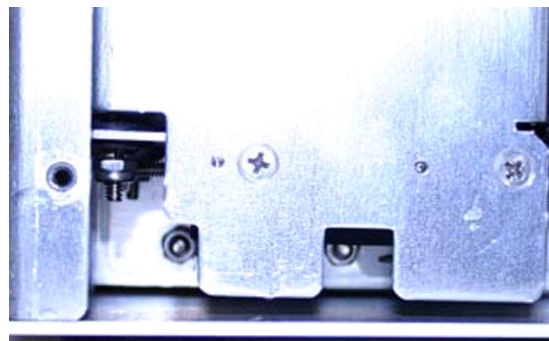


Figure 16: Pump mounting nuts (bottom)

5. To remove a pump, you must first disconnect the following cables from the control board:

Rear Pump	Front Pump
Sensor P17	Sensor P19
Motor P27	Motor P28

6. Tilt the pump assembly out and lift up to remove, taking care not to damage the wires attached to the pump home sensor (Figure 17).

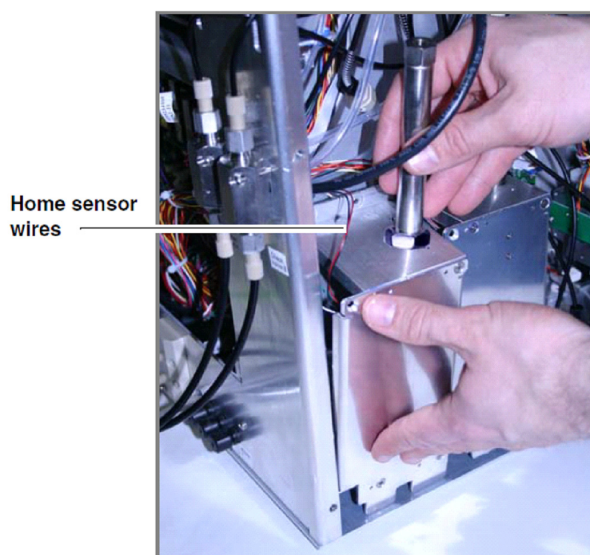


Figure 17: Pump removal

Replacing the Pump Seals

To access the pump seals:

1. Remove the pump as instructed in the Removing the Pumps section above.
2. Loosen the cylinder lock nut with an adjustable or 15/16" open end wrench.

3. Remove the cylinder using the 5/8" open end wrench.
4. Unscrew the piston retainer, which has flats to accommodate the 1/4" open end wrench.
5. Remove the old wear ring by peeling it apart at the diagonal cut (Figure 4).
6. Clean the piston with isopropyl alcohol, removing all traces of the old wear ring.

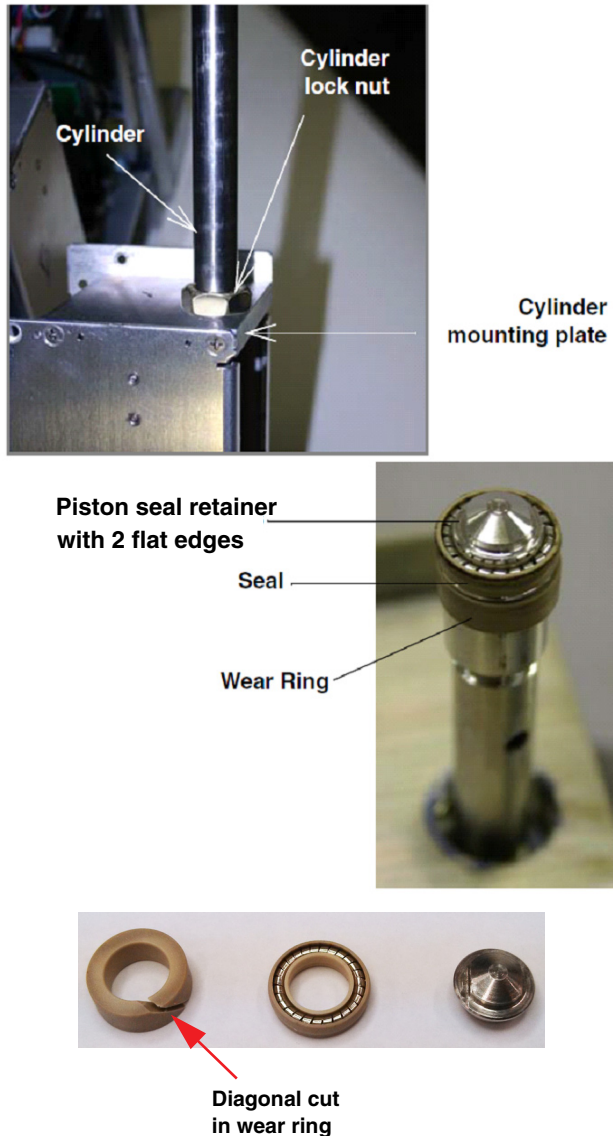


Figure 18: Pump cylinder and seals (showing wear ring and seal with the metal retainer removed)

Note

If the pump seals are dark brown with an O-ring and the seal retainer has 6 flat edges as shown above, a new piston seal retainer part# 695233665 will be needed to install the new seals.



Obsolete brown seal with black O-ring and seal retainer with 6 flat edges.

7. . Flex the new wear ring over the shaft and insert it into the groove.

Installing the Seals

The following steps refer to Figures 19 & 8:

1. Install the seal on the retainer with the spring facing up.
2. Thread the assembled retainer and seal onto the piston and tighten using a 1/4" open end wrench.

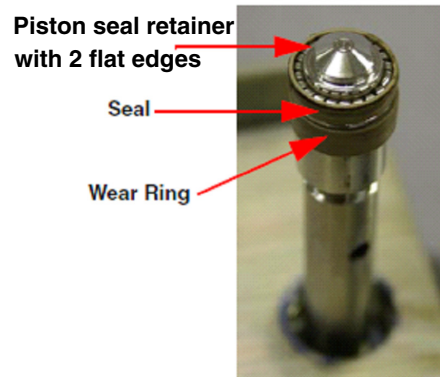


Figure 19: Piston

3. While the cylinder is removed, clean the cylinder inside diameter using IPA and a soft bottle brush. Swipe the length of the interior wall with a cotton swab; if any residue is on the swab, continue cleaning until none remains.
4. Blow out the inside diameter with pressurized air.
5. Before installing the cylinder, clean the cylinder with isopropyl alcohol and wet the seal with solvent to prevent seal damage.
6. Tighten the cylinder until it stops against the cylinder mounting plate. The cylinder requires no height adjustment because the mounting plate has a cylinder stop machined into it.
7. Tighten the lock nut (Figure 6).

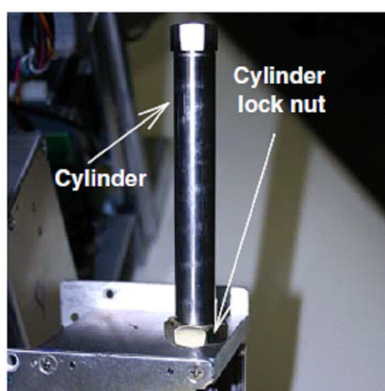


Figure 20: Pump cylinder and lock nut

8. Click on HELP then SERVICE to enter the service menu to reset the pump stroke count (Figure 21).

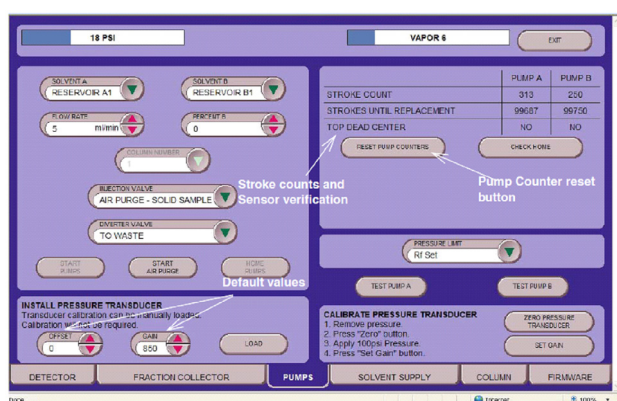


Figure 21: Service menu

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