
Periodic Maintenance

This section provides periodic maintenance guidelines for keeping the InkCenter™ Refill System in optimal operational condition and detailed descriptions of maintenance procedures. The information is grouped under the following topics

<i>7.1 Service Kit Tools</i>	7-2
<i>7.2 Service Kit Spare Parts</i>	7-3
<i>7.3 Total Service Call</i>	7-4
<i>7.4 Semi-Annual Maintenance</i>	7-5
<i>7.5 Maintenance Procedures</i>	7-6
<i>7.5.1 Calibrating the Ink Syringes</i>	7-6
<i>7.5.2 Testing for Syringe Leaks</i>	7-7
<i>7.5.3 Lubricating the Interlock Guide Plates</i>	7-10
<i>7.5.4 Cleaning the Prep Station Vacuum Lines</i>	7-12
<i>7.5.5 Servicing the Vacuum Wand</i>	7-13
<i>7.5.6 Cleaning the Float Sensors</i>	7-14
<i>7.5.7 Testing the Flow at the Prep Stations</i>	7-17

7.1 Service Kit Tools

Part	Description
Nylon loop-handle brush	1/4" diameter, 3/4" brush length, 4" min. length overall (McMaster-Carr: 7221T37)
Hex key set	English (fractional), 7/32" down to 0.50"; Metric, 6mm
Needle nose pliers	
Crescent wrench	Adjustable (up to 1 1/16")
Diagonal cutters	
Torx drivers	T10, T15, T20, T25, T27
Flat tip screwdriver	Various sizes (up to 3/16"), optional stubby 3/16"
Phillips screwdriver	Various sizes (up to 2")
Small flashlight	
Socket wrench	10mm driver, 7/16" driver, 4" extension
Hex driver	Ball end 1/8" Hex driver, 8" minimum blade length (McMaster-Carr: 5497A39)
Tubing cutter	(McMaster-Carr: 8288A51)
Large/Small paperclips	Used to clear prep vacuum and ink nest vent holes
Multimeter	

7.2 Service Kit Spare Parts

Part	Part Number	Description
Drill bit	301186-00	Special 5/64" short fluted drill bit
Fluid sense board	300887-00-02	Custom PCB with tubing sensor
Prep seals	300863-02	Custom molded seal
HP 45 seals	300720-01	Custom molded seal
Ink fill seal pad	301006-01	Custom molded seal and baseplate
Yellow/black injector	300729-00	Dispensing injector keyed for yellow or black ink
Cyan injector	300728-00	Dispensing injector keyed for cyan (blue) ink
Magenta injector	300727-00	Dispensing injector keyed for magenta (red) ink
Ink bottle caps	TBD	Septum cap
FEP tubing	300820-00	1/4" OD tubing for prep stations--specify 27" length
HP1 evac seal	300355-00	Custom molded seal with adhesive backing for use on prep flap of HP1 refill adapters
HP2 evac seal	300362-00	Custom molded seal with adhesive backing for use on prep flap of HP2 refill adapters
HP3 evac seal	300660-00	Custom molded seal with adhesive backing for use on prep flap of HP3 refill adapters
Lex1 evac seal	300691-00	Custom molded seal with adhesive backing for use on prep flap of Lex1 and Lex2 refill adapters
Lex3 black evac seal	300691-00	Custom molded seal with adhesive backing for use on prep flap of Lex3 black refill adapters
Lex3 color evac seal	300703-00	Custom molded seal with adhesive backing for use on prep flap of Lex3 color refill adapters
Syringe	TBD	10 ml glass syringe
Pogo interface board	300435-01-01	Custom PCB with four double-rows of pogo pin blocks
I/O board fuse	TBD	Syringe power 6.3a plug-in fuse

7.3 Total Service Call

Perform the following maintenance tasks each time you make a service call.

1. Resolve primary issue and check with lab personnel for any additional problems.
 2. Service the vacuum wand (see “Servicing the Vacuum Wand” on page 7-13).
 3. Verify all ink lines are primed.
 4. Run syringe leak test; resolve any leaks.
 5. Perform prep fluid flow check; clean holes in prep station thoroughly with a large paperclip.
 6. Open all four ink drawers and inspect for leaks. Also look for ink bottles that appear to be “sucked in” due to a clogged vent. Clean any clogs with a small paperclip, if necessary.
 7. In Tech Pane, check the following: separator vacuum level (15.5 in/hg) and decay rate (approximately 0.1 - 0.2 in/hg/sec).
 8. Check the fill chamber door for cracks, and that the door seal is in position with the screws set normally; perform vacuum chamber leak check = vacuum reaches 25.5in/hg, and holds maximum vacuum with no leaks.
 9. Remove all covers, including the table top, and check for leaks; clean as needed.
 10. Check drill bit - verify that the shield extends fully.
 11. Check interconnect board - no bent/missing/sticky pins.
 12. Verify all system fans are running.
 13. Blow or wipe off dust and wipe down machine.
 14. Drain the separator (do this last, from the main operator screen).
 15. Run some cartridges through all processes to check functionality before leaving site.
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7.4 Semi-Annual Maintenance

Once every six months, perform the following maintenance tasks on each system.

TASK

1. Perform all Total Service Call tasks.
 2. Check all adapters for damage or problems. Check the seals on refill adapters and check to be sure the springs on all adapters hold cartridges securely.
 3. Tighten the set screw on the drill bit assembly with a 1/8" allen key driver. Repeat the process on the spare drill bit assembly which should be located in the supplies drawer.
 4. Check all 40 fittings on the syringe pump valves by hand to ensure that they are snug (see "Replacing the Fluid Distribution Valve" on page 5-88).
 5. Check all three fittings on the HP45 station by hand to ensure that they are snug (see "Replacing the HP45 Station Assembly" on page 5-78).
 6. Check all four fittings entering the back of the vacuum chamber by hand to ensure that they are snug (see "Replacing the Vacuum Chamber" on page 5-55).
 7. Check all eight fittings inside the vacuum chamber by hand to ensure that they are snug (see "Replacing the Vacuum Chamber" on page 5-55).
 8. Check for signs of leaks in the various connections in the plumbing tower.
 9. Clean prep vacuum lines with tubing brush where they pass through the fluid sensors (see "Cleaning the Prep Station Vacuum Lines" on page 7-12).
 10. Run a Self Clean from the Admin screen and verify that, after about 30 seconds of operation, fluid fills all four ink dispensing lines and then is vacuumed away.
 11. Inspect the HP45 seal for damage or signs of leaking (see "HP45 Station Seal" on page 5-80).
 12. Replace the inline filters.
 13. Clean the separator and level sensor.
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7.5 Maintenance Procedures

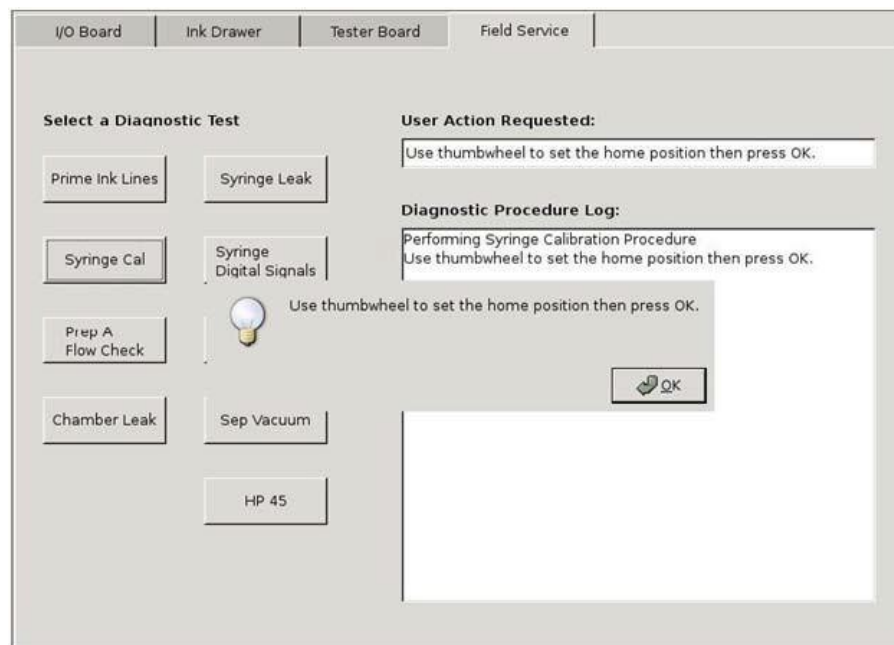
7.5.1 Calibrating the Ink Syringes

This process is used to set the home position of the syringes after they are tightened or changed. Since all four syringes move at the same time - you only need to run Syringe Calibration test once.

TASK

1. To begin the test, press Syringe Cal. The process will start and display the following screen:

Figure 7.1:Syringe Cal Test in Process



At this point the syringe plungers are in what's called "soft home" position. The syringe plungers are not actually touching the tops of the syringes.

2. Using the thumbwheel located at the base of the infusion pump, move the syringe tips up by turning the thumbwheel to the LEFT, until the thumbwheel stops turning. At this point the syringe plungers are at their top position.
3. Back off the syringe plungers a bit by turning the thumbwheel to the right a small amount (about 1/4").
4. Press the OK button when you are done.

The system stores the home position setting into memory.

7.5.2 Testing for Syringe Leaks

The Syringe Leak test is perhaps the single most important diagnostic test in the system. Basically it tests the following two areas for vacuum leaks:

- The dispense lines, including the valves, running from port "C" through to the back of the fill chamber to the injector lines inside the fill chamber
- The syringes, including the plungers

The test guides you through the steps with pop-ups when an action is required. Other than the chamber leak test that is performed at the start of the process, the remainder of the test requires the user to assess what leaks are occurring by visual inspection.

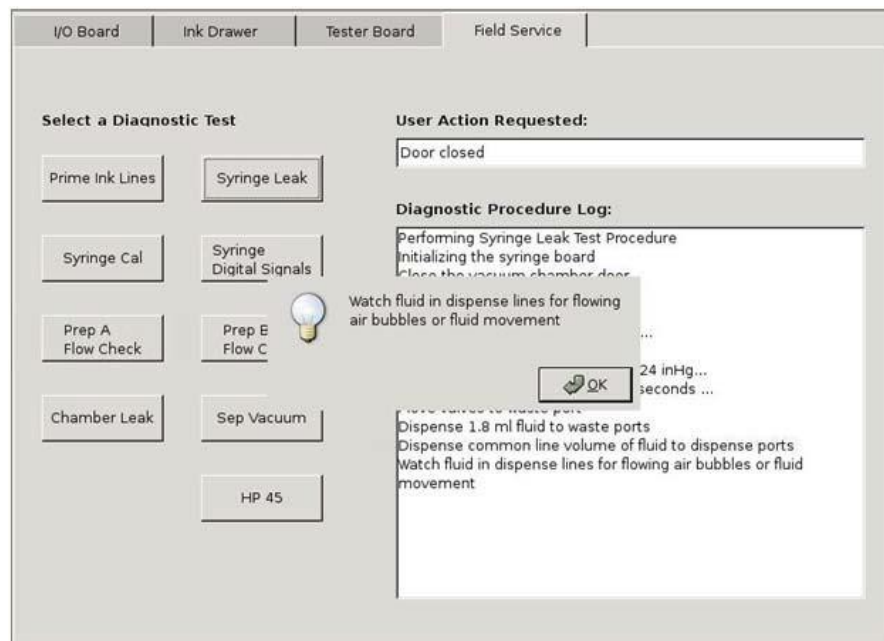
TASK

1. To begin the test, press Syringe Leak. If the chamber door is not shut, the system will prompt you to shut the door before it continues with the test.

Step Result: The system will first do a chamber leak test by holding the chamber at 24 inHg for 10 seconds. Any large leaks will cause the test to fail.

Once the chamber leak test is complete and if it passes, the system will dispense a small amount of fluid to the dispense lines.

Figure 7.2: Syringe Leak Test, Fluid Dispensing to Ports

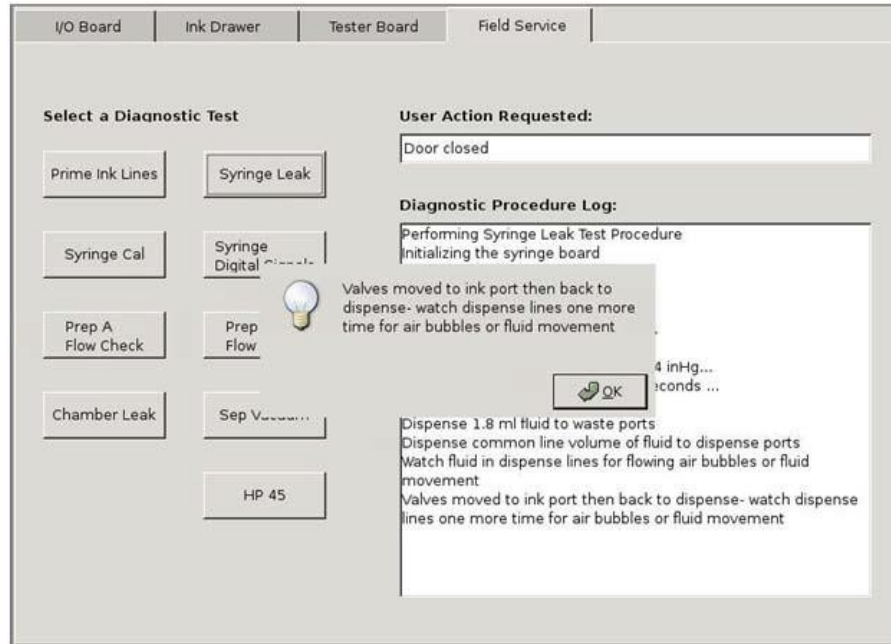


Step Result: A small dialog box will display, directing you to check the dispense lines for air flowing through the dispense lines.

There are two places to check for air movement: the dispense line from each valve at port "C", and the injector lines inside the fill chamber.

2. Look at each line carefully for moving air or fluid, not stationary bubbles. Fluid or air movement at the dispense line from port "C" of a valve indicates an air leak either at the connection of the line to the valve, or internally to the valve. Fluid or air movement in the lines inside the fill chamber indicates a leak in the connection at the back of the chamber.
3. Press OK to continue.

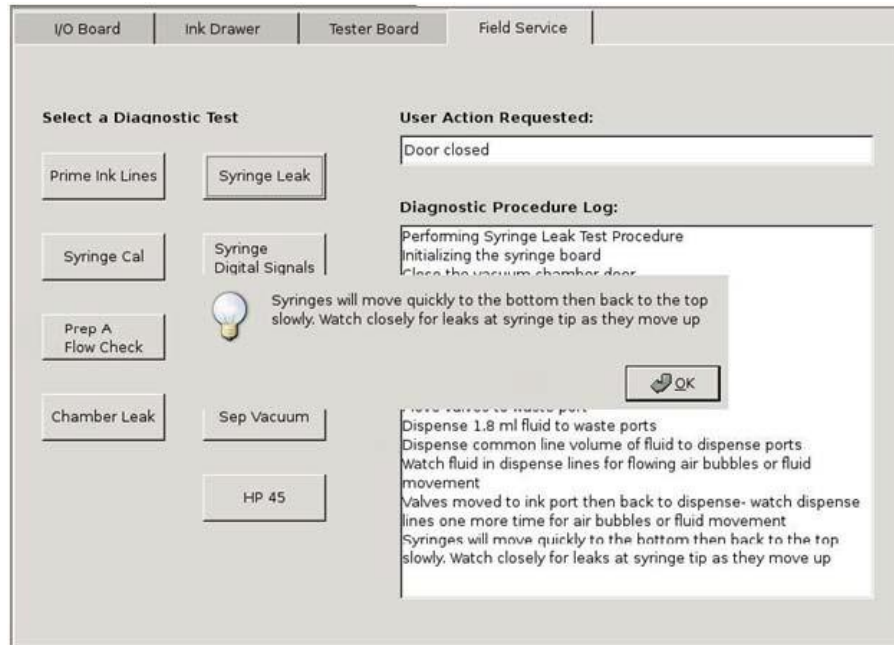
Figure 7.3:Syringe Leak Test, Valves Moved to Port



Step Result: The valves will cycle to an ink port, then back to dispense. Check again for leaks at all points mentioned before. Press OK to continue.

The next dialog box to display describes the second part of the syringe leak test.

Figure 7.4: Syringe Leak Test, Syringes Moved to Bottom



4. Press OK.

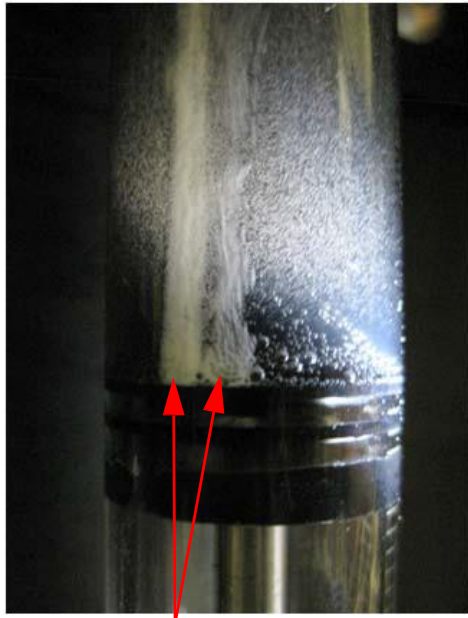
Step Result: The syringes will begin to move as the dialog box states.

At the point where the syringes are bottomed out and start to move up, you will want to pay attention to the top of each syringe plunger for air moving across the seal.

Note: There may be bubbles in the fluid or on top of the fluid slug in the syringe. This is normal and should be ignored.

Step Result: If there is a leak in the syringe, it will show as a stream of bubbles traveling up into the fluid slug, much like air bubbles in a fish tank, as illustrated below.

Figure 7.6: Syringe Leak Test, Demonstration of Syringe Leak



Leaks in the syringe (extreme case) - you may see a smaller amount of air flow, and any air leaking through justifies replacing the syringe.

5. Another dialog box will display, asking if you want to run the syringes up and down again. Press "No" to end the Syringe Leak test.

Note: Be sure to run "Syringe Calibration" on page 6-9 if you replace any syringes.

7.5.3 Lubricating the Interlock Guide Plates

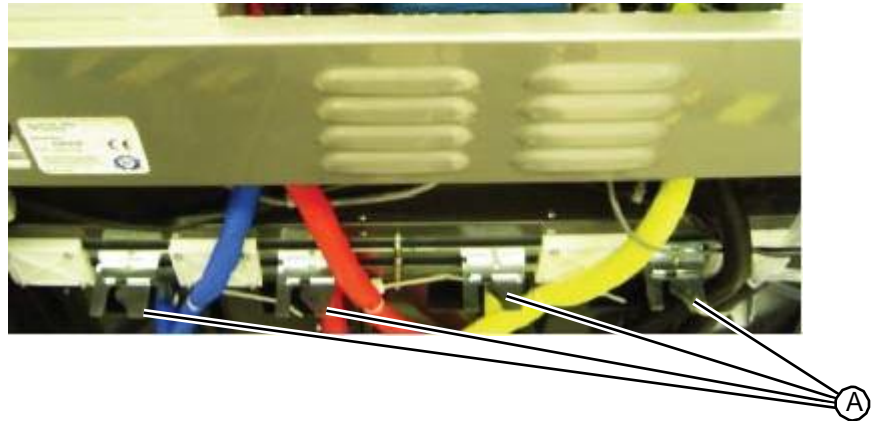
The guides plates located at the back of each ink drawer are part of the interlock system that prevents the opening of more than one drawer at a time. In order to maintain smooth drawer movement, the inner surfaces of the plates must be lubricated periodically.

- Lubricating grease or oil

TASK

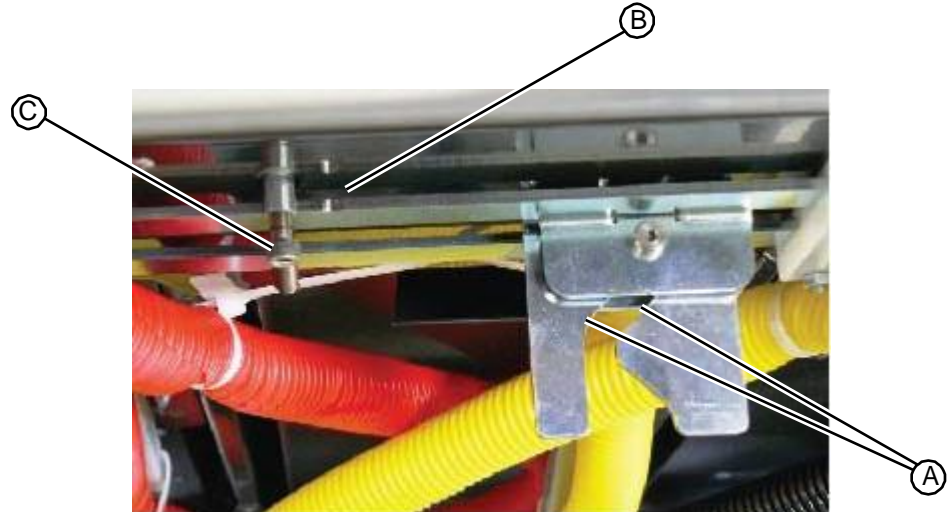
1. Remove the rear access panel (see "Removing the Rear Access Panel" on page 5-10).
2. Locate the four interlock guide plates located at the back of the unit.

Figure 7.6:Location of interlock guide plates



3. Spray or drop lubricating oil or grease onto the interior angled surfaces of a guide plate and between the detent pin and the notch in the rail.

Figure 7.7:Areas to lubricate



4. Open and close the drawer a few times to distribute the lubricating oil.
5. Repeat this process on each of the interlock guide plates.
6. Replace the rear access panel (see “Replacing the Rear Access Panel” on page 5-10).

7.5.4 Cleaning the Prep Station Vacuum Lines

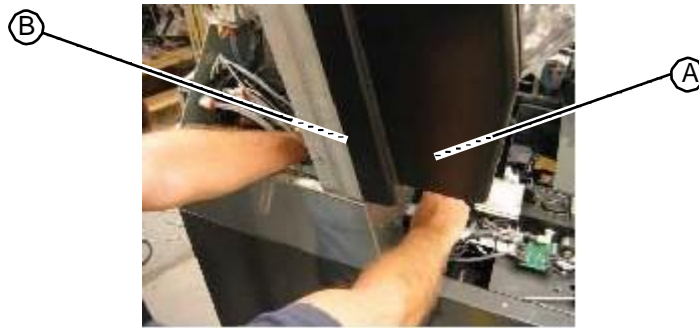
Ink stains inside the prep station vacuum tubing near the prep station sensor can impact readings. Therefore, the tubing must be cleaned periodically. **If you are working on a dual-prep system, begin with prep station A, the one closest to the back of the system.**

- T15 torx driver
- 3/16" hex tool
- Tube brush

TASK

1. Remove the upper hood (see "Removing the Upper Hood" on page 5-3).
2. Remove the work surface (see "Removing the Work Surface" on page 5-11).
3. Remove the drill side fascia (see "Removing the Drill Side Fascia" on page 5-5).
4. Remove the fluid sensor PC board (see "Removing the Fluid Sensor PC Board" on page 5-37).
5. Remove the vacuum tubing from the fitting on the prep station by completing the following steps:
 - a Stand next to the system and grasp the vacuum tubing inside the system with your left hand.
 - b With your right hand, press in on the orange collar of the prep station fitting.
 - c Pull the tubing out of the fitting with your left hand.

Figure 7.8: Removing tubing from prep station A



6. Insert the tube brush into the tubing as far as possible and scrub back and forth several times to remove the ink stains inside the tubing.
7. Replace the prep station vacuum tubing.
8. If this is a dual-prep system, repeat the process for prep station B, the one located closest to the front of the system.
9. Replace the fluid sensor PC board (see "Replacing the Fluid Sensor PC Board" on page 5-39).
10. Check for leaks by either running a prep routine, or using the tech pane to flush fluid through the prep station (see "Prep A/B Flow Check" on page 6-10).
11. Replace the drill side fascia (see "Replacing the Drill Side Fascia" on page 5-7).

12. Replace the work surface (see “Replacing the Work Surface” on page 5-12).
 13. Replace the upper hood (see “Replacing the Upper Hood” on page 5-4).
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7.5.5 Servicing the Vacuum Wand

- Flat head screwdriver

TASK

1. Log on to the system and press **Admin**.
2. Select **Vacuum Wand** and press **On**.
3. Squeeze the vacuum wand handle and keep the vacuum on until the vacuum tubing is clear of fluid.
4. From the Admin screen, disable the vacuum wand and squeeze the handle once more to bleed off the remaining vacuum in the system.
5. Put on a pair of gloves to prevent ink stains during the remaining procedure.
6. Press down on the orange fitting collar that secures the tubing to the wand and firmly pull the tubing out of the fitting.
7. Using a flat head screwdriver, release the two snaps that secure the handle to the body of the vacuum wand. Remove the handle and set it aside.



8. Using a flat head screwdriver, gently pry the plunger and spring from the wand.

Figure 7.9: Liquid separator assembly components



9. Clean any debris from the plunger and the spring.
10. Reinstall the plunger and spring into the body of the wand, being careful to orient the plunger so that the semi-circular protrusion has the curved portion nearest the tubing fitting and the flat portion nearest the metal tube and aligned perpendicular to the sides of the wand.
11. Reinstall the vacuum wand handle and make sure you firmly snap both sides.
12. Verify that the vacuum wand operates properly by squeezing the handle and ensuring that it snaps positively closed when the handle is released. If the operation is still not acceptable, order a replacement vacuum wand assembly.
13. Reinstall the vacuum wand to the cleanup tube in the maintenance drawer by pressing the tubing firmly into the fitting. Be sure that you feel the tubing enter the fitting, then slide under firm resistance for roughly 1/2" before it finally hits a hard stop in the fitting. Pull firmly on the tubing to verify that it is properly seated in the fitting.

NOTE: Failure to fully seat the tubing in the fitting will result in vacuum leaks and system errors.

14. Coil the tubing and replace the vacuum wand in its holster in the maintenance drawer.

7.5.6 Cleaning the Float Sensors

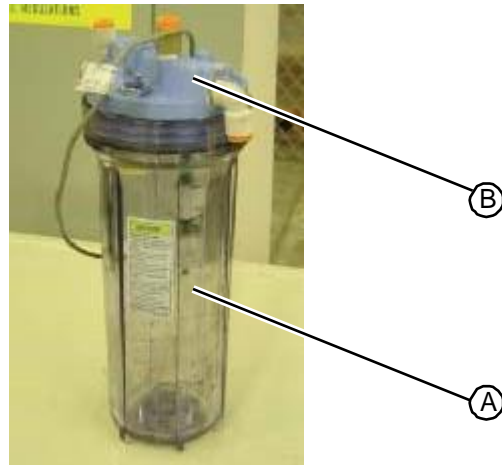
The float sensors for the waste separator are attached separator cap. These sensors must be cleaned periodically to ensure proper operation.

- T20 torx driver
- T25 torx driver

TASK

1. Remove the liquid separator assembly (see "Removing the Liquid Separator Assembly" on page 5-183).
2. Remove the cap unit from the sump. Clean the sump if it is dirty and install the new cap on the sump that was in the system.

Figure 7.9:Liquid separator assembly components



3. Remove the cap unit from the sump. Clean the sump if it is dirty.
4. Clean the float sensor assembly attached to the liquid separator cap.

Figure 7.10:Float sensor assembly



5. Clean the float sensor assembly.
6. Replace the liquid separator cap assembly onto the liquid separator sump.

Figure 7.11:Cleaned components assembled

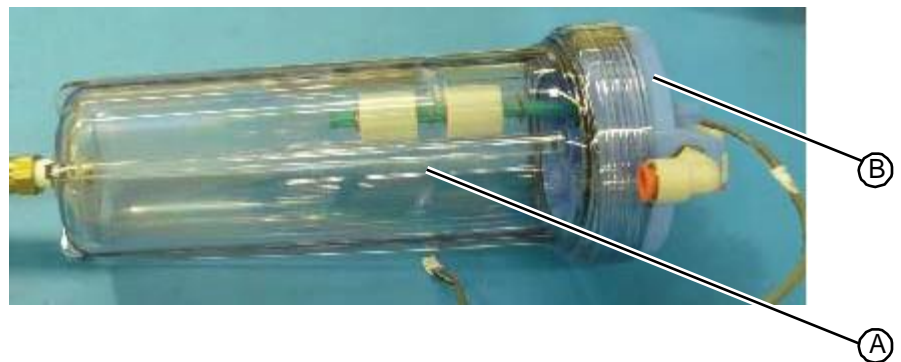


Figure 7.9: Liquid separator assembly (see “Replacing the Liquid Separator Assembly” on page 5-188).

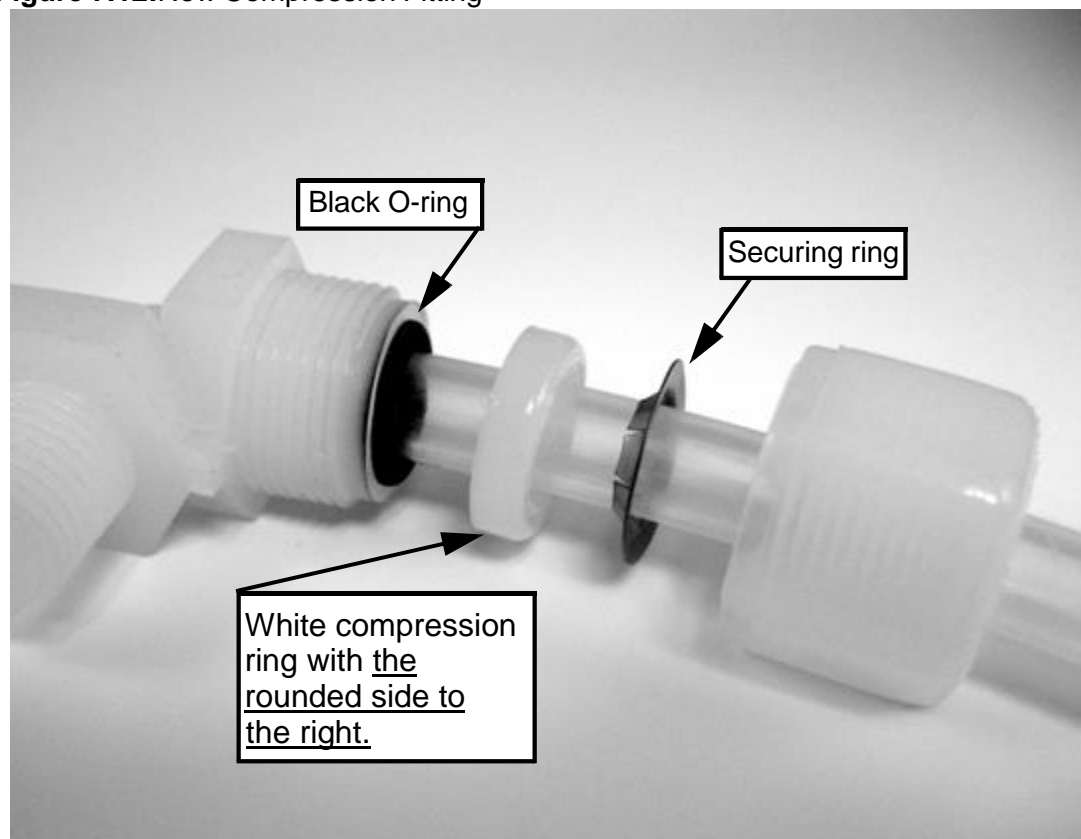
New Compression Fitting

The white compression fitting is now being included with the separator bottle due to the compression fittings not being reassembled correctly or missing some parts after some service calls. The existing fitting is reusable, but if any parts are missing, please use the included compression fitting.

Please check to make sure all parts are included and oriented in the correct direction prior to installation. This is important to prevent leakage from the bottom of the separator during normal use.

Please refer to the image below for guidance when reassembling the compression fitting:

Figure 7.12: New Compression Fitting



For successful installation:

- Make sure you put the cap of the fitting on the tube first.
- Place all three rings together on the fitting body and push the tube into the fitting through the three rings until the end of the tube bottoms out. Now tighten the cap. This will make sure the rings are correctly spaced as shown below:

Figure 7.13: New Compression Fitting with Rings Properly Spaced



7.5.7 Testing the Flow at the Prep Stations

Follow this procedure if the liquid separator float sensors become jammed with sludge. slower than normal flow of cleaning fluid at the prep station can contribute to the waste being too thick. This procedure verifies the proper cleaning fluid flow at the prep station.

TASK

1. Press the white **T** in the lower right corner of the RIS interface.
2. Press the **Tech Pane** button that appears near the lower middle portion of the screen.
3. Perform the following steps within the Tech Pane to verify the cleaning fluid flow at prep station A.
 - a Turn on the Vacuum Pump.
 - b Turn on the Vacuum Valve for prep station A.
 - c Turn on the Fluid Pump.
 - d Turn on the Rinse Valve for prep station A.
 - e Watch the flow at prep station A. The figures at the end of this task show examples of good and obstructed flow.
 - f Turn off the Rinse Valve for prep station A.
 - g Turn off the Vacuum Valve for prep station A.

Figure 7.13: New Compression Fitting with Rings Properly Spaced

4. Perform the following steps within the Tech Pane to verify the cleaning fluid flow at prep station B.
 - a Turn on the Vacuum Valve for prep station B.
 - b Turn on the Rinse Valve for prep station B.
 - c Watch the flow at prep station B. The figures at the end of this task show examples of good and obstructed flow.
5. Shut down the flow at the prep station by completing the following steps in the Tech Pane.
 - a Turn off the Fluid Pump.
 - b Turn off the Rinse Valve.
 - c Turn off the Vacuum Valve.
 - d Turn off the Vacuum Pump.
6. If the flow at a station is bad, remove and replace the prep station.

Figure 7.14: Example of good flow at a prep station



Figure 7.15: Example of bad flow at a prep station



Figure 7.15: Example of bad flow at a prep station

