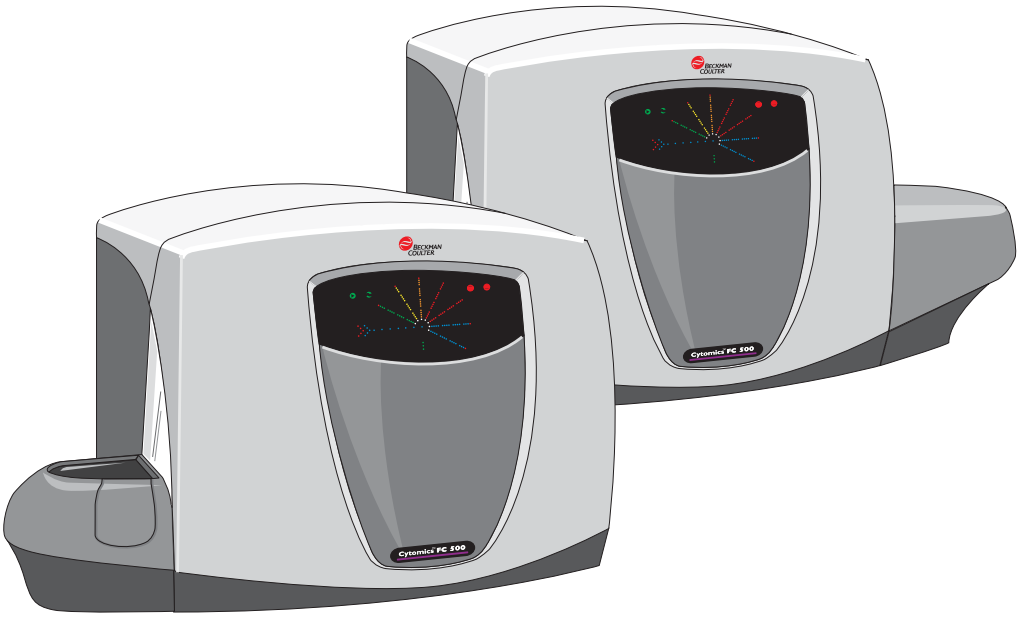
Cytomics FC 500
With CXP Software

Special Procedures



PN 175572B (June 2004)

Beckman Coulter, Inc.
Fullerton, CA 92835

WARNINGS AND PRECAUTIONS

READ ALL PRODUCT MANUALS AND CONSULT WITH BECKMAN COULTER-TRAINED PERSONNEL BEFORE ATTEMPTING TO OPERATE INSTRUMENT. DO NOT ATTEMPT TO PERFORM ANY PROCEDURE BEFORE CAREFULLY READING ALL INSTRUCTIONS. ALWAYS FOLLOW PRODUCT LABELING AND MANUFACTURER'S RECOMMENDATIONS. IF IN DOUBT AS TO HOW TO PROCEED IN ANY SITUATION, CONTACT YOUR BECKMAN COULTER REPRESENTATIVE.

HAZARDS AND OPERATIONAL PRECAUTIONS AND LIMITATIONS

WARNINGS, CAUTIONS, and IMPORTANTS alert you as follows:

WARNING - Can cause injury.
CAUTION - Can cause damage to the instrument.
IMPORTANT - Can cause misleading results.

BECKMAN COULTER, INC. URGES ITS CUSTOMERS TO COMPLY WITH ALL NATIONAL HEALTH AND SAFETY STANDARDS SUCH AS THE USE OF BARRIER PROTECTION. THIS MAY INCLUDE, BUT IT IS NOT LIMITED TO, PROTECTIVE EYEWEAR, GLOVES, AND SUITABLE LABORATORY ATTIRE WHEN OPERATING OR MAINTAINING THIS OR ANY OTHER AUTOMATED LABORATORY ANALYZER.

WARNING Risk of operator injury if:

- All doors, covers and panels are not closed and secured in place prior to and during instrument operation.
- The integrity of safety interlocks and sensors is compromised.
- Instrument alarms and error messages are not acknowledged and acted upon.
- You contact moving parts.
- You mishandle broken parts.
- Doors, covers and panels are not opened, closed, removed and/or replaced with care.
- Improper tools are used for troubleshooting.

To avoid injury:

- Keep doors, covers and panels closed and secured in place while the instrument is in use.
- Take full advantage of the safety features of the instrument. Do not defeat safety interlocks and sensors.
- Acknowledge and act upon instrument alarms and error messages.
- Keep away from moving parts.
- Report any broken parts to your Beckman Coulter Representative.
- Open/remove and close/replace doors, covers and panels with care.
- Use the proper tools when troubleshooting.

CAUTION System integrity might be compromised and operational failures might occur if:

- This equipment is used in a manner other than specified. Operate the instrument as instructed in the Product Manuals.
- You introduce software that is not authorized by Beckman Coulter into your computer. Only operate your system's computer with software authorized by Beckman Coulter.
- You install software that is not an original copyrighted version. Only use software that is an original copyrighted version to prevent virus contamination.

IMPORTANT If you purchased this product from anyone other than Beckman Coulter or an authorized Beckman Coulter distributor, and, if it is not presently under a Beckman Coulter service maintenance agreement, Beckman Coulter cannot guarantee that the product is fitted with the most current mandatory engineering revisions or that you will receive the most current information bulletins concerning the product. If you purchased this product from a third party and would like further information concerning this topic, call your Beckman Coulter Representative.

REVISION STATUS

Issue A, Initial Issue, 6/03
CXP Software Version 1.0. Initial issue for customer distribution.

Issue B, 6/04
CXP Software Version 2.0.

Additions, changes or deletions were made at these locations:
1-3, 1-5, 1-6, 1-10, 1-14, 1-24, 1-27, 1-31, 1-31, 1-32, 1-36, 1-41, 1-43, 1-46, 1-50, 2-8, 2-13, 2-22, 2-26, 2-30, 2-35, 2-38, 2-41, 2-47, 2-54, 2-55, 2-58, 2-59 and A-1 through A-7.

This document applies to the latest software listed and higher versions. When a subsequent software version changes the information in this document, a new issue will be released.

REVISION STATUS

CONTENTS

CONTENTS

This introductory section contains the following topics:

- USING YOUR Cytomics FC 500 MANUALS
- ABOUT THIS MANUAL
- CONVENTIONS, and
- GRAPHICS.

USING YOUR Cytomics FC 500 MANUALS

The manuals listed below are available as PDF files in the FC 500 CXP software and the Operator's Manuals CD-ROM. Printed versions of these manuals are also available by order.

Use the **Reference** manual for instrument specifications and information on installation and system options.

Use the **Instructions For Use** manual for the day-to-day running of your instrument. Go through the detailed step-by-step procedures of startup, quality control (QC), running samples, analyzing data, printing reports, reviewing QC data, shutdown. It contains safety and troubleshooting information, error messages, as well as in-depth information on the principles of flow cytometry, information about what your instrument does, and the methods it uses.

Use the **Special Procedures** manual to clean, replace, or adjust a component of the instrument.

Use the **Getting Started** manual as a brief introduction to the system.

Use the **Master Index** to easily locate a topic in any of your manuals.

ABOUT THIS MANUAL

Your FC 500 Special Procedures manual describes how to clean, replace or adjust a component of the system.

This information is organized as follows:

- Chapter 1, CLEANING PROCEDURES

  Provides procedures for cleaning parts of the system.
- Chapter 2, REPLACE/ADJUST PROCEDURES

  Provides procedures for replacing or adjusting parts.
- Appendix A, MAINTENANCE AND SERVICE LOGS

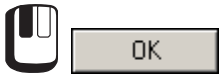
  Provides procedures for entering comments in the Maintenance Log.
- INDEX

  Use the Index to easily locate specific information in this manual.

CONVENTIONS

This manual uses the following conventions:

- Throughout this manual your FC 500 is also referred to as the system or instrument.
- **Bold font** indicates a software option, such as **Cytometer**.
- *Italics font* indicates screen text displayed on the instrument, such as *Preparing Samples*.
- `Courier font` indicates text you have to type using the keyboard.
- ▢ indicates a key (such as Enter).
- ▢+▢ indicates that the two keys listed (such as Alt+F2) are linked for a specific function and must be pressed in this sequence:
  a. Press down on the first key listed and while continuing to press it, press down on the second key listed.
  b. Release both keys at the same time.
- ▢ ▢ indicates to press and release the first key listed then press and release the next key listed. For example: Y Enter.
- Icons/buttons to select functions on the software screen are shown within text.

  Example:  .
-  indicates to use the mouse to select the screen button labeled  .
-  **File ▸▸ Save** indicates to use the mouse to select the **Save** item on the **File** menu.
- F1 through F12 are special function keys.
- A **Note** contains information that is important to remember or helpful in performing a procedure.
- The terms “screen” and “window” are used interchangeably.
- ***SHOW ME*** means there is a video available for the procedure in the online help.

To Choose A Command With The Keyboard

After you press Alt, each menu name has one letter underlined to indicate which letter to use to pull down the menu. For example, the letter F in the File menu is underlined, press F to pull down the File menu; the letter E in the Edit menu is underlined, press E to pull down the Edit menu.

Command	Function
Enter	Accepts your selection.
Esc	Stops the operation, discarding your choices.
Tab	Moves cursor over different choices if there are multiple options - see Windows® manuals for Windows operation via keyboard.
Alt+Tab	When you have more than one application Window open, use Alt+Tab to switch between tasks.

Dialog Box

Dialog boxes receive commands or information; for example, a file name dialog box receives information about a file name.

Accepts the information you have selected or typed.

Stops the operation, ignoring your choices.

Description of Reporting Units

Unless otherwise stated, all parameter units are shown in the US unit format (cells/µL) throughout the manuals.

GRAPHICS

All graphics, including screens and printouts, are for illustration purposes only and must not be used for any other purpose.

1.1 WHAT THIS CHAPTER EXPLAINS

This chapter explains how to clean the:

- Sample system (daily) before the daily shutdown procedure, CLEAN THE SAMPLING SYSTEM.
- MCL sample head and sample probe (weekly), CLEAN THE MCL SAMPLE HEAD AND THE SAMPLE PROBE.
- Air filters (weekly) after the shutdown procedure, CLEAN THE AIR FILTERS.
- Sheath fluid container (monthly), CLEAN THE SHEATH FLUID CONTAINER.
- Cleaning agent container (every 60 days), CLEAN THE CLEANING AGENT CONTAINER.
- Vacuum trap (VAC TRAP) on the Power Supply (as needed), CLEAN THE VACUUM TRAP.

Other general procedures in this chapter are:

- PUT THE CYTOMETER IN THE IDLE MODE
- OPEN/REMOVE THE INSTRUMENT COVERS
- REMOVE THE REAGENT CONTAINERS
- REPLACE THE REAGENT CONTAINERS
- POWER THE CYTOMETER ONLY ON/OFF.

1.2 CLEANING SCHEDULE

See Table 6.1, Cleaning Schedule in the TROUBLESHOOTING chapter in the Instructions For Use manual.

1.3 CLEAN THE AIR FILTERS

- Clean the air filters weekly per Table 6.1, Cleaning Schedule in the Instructions For Use manual. It is easiest to clean the air filters after performing the shutdown procedure.
- Instructions and graphics are given for both Power Supply configurations. Use the procedure (Procedure 1 or Procedure 2) that corresponds to your Power Supply configuration.

Procedure 1

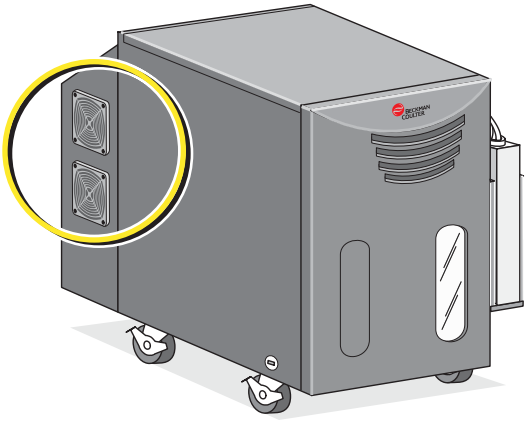
If you have the Universal Power Supply configuration:

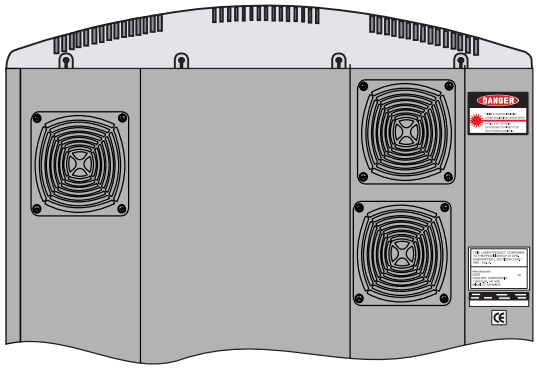
Follow Procedure 1 to clean the air filters.

Location of Air Filters

The instrument has five air filters located on the:

- Cytometer Back Panel (3)
- Power Supply, Left Side Panel (2).

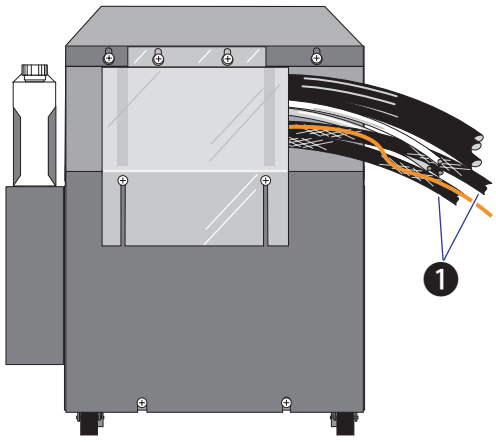




Prepare to Clean the Air Filters

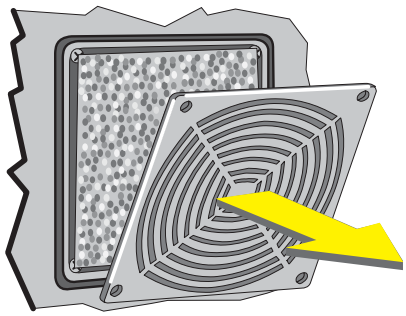
1 Power the Cytometer OFF.

2 Unplug both Power Supply power cords ❶ from the wall outlet.



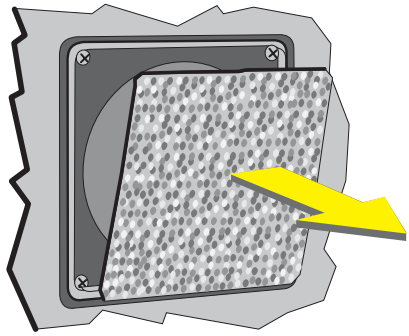
3 Pull off each filter cover. Even though the covers look like they are screwed in, they are not.

The filter covers are made of flexible plastic; they snap out when you pull them. Grab a segment of the grille between your thumb and index finger and then pull.



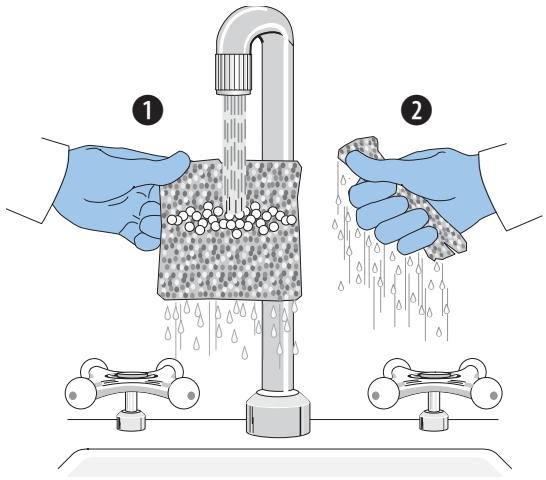
4 Gently pinch and pull out each filter.

Handle them gently to avoid damaging them.



Rinse and Return the Air Filters

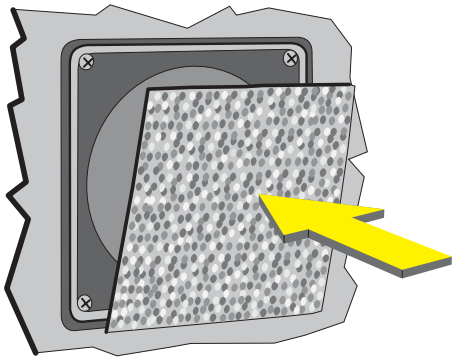
1 Rinse each filter in water ❶, and then wring it out ❷.



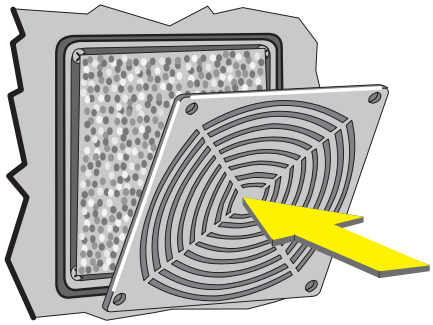
2 Set each filter aside and let it dry out for about 30 minutes.

Use paper towels to check that each filter is completely dry.

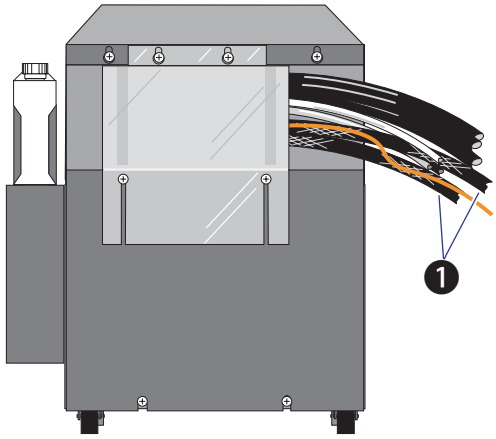
3 Return each filter into its holder. Replace any torn filters.



4 Put each filter cover back on.



5 Plug in both Power Supply power cords ❶ into the wall outlet.



6 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

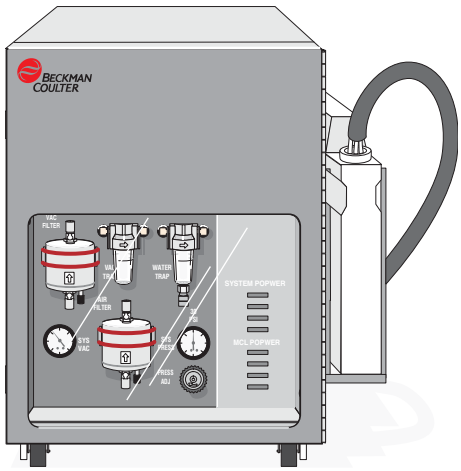
7 Record that the air filters were cleaned on the electronic Maintenance Log.

8 Perform the Daily Startup procedure before running samples.

Procedure 2

If you have the Voltage-specific Power Supply configuration:

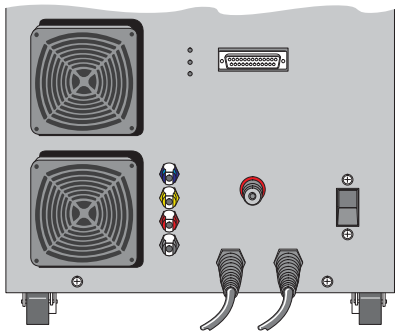
Follow Procedure 2 to clean the air filters.

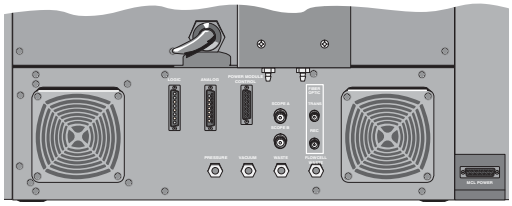


Location of Air Filters

The instrument has four air filters located on the:

- Power Supply, Back Panel (2).
- Cytometer Back Panel (2)

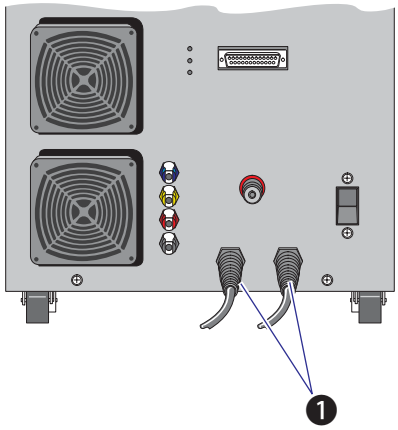




Prepare to Clean the Air Filters

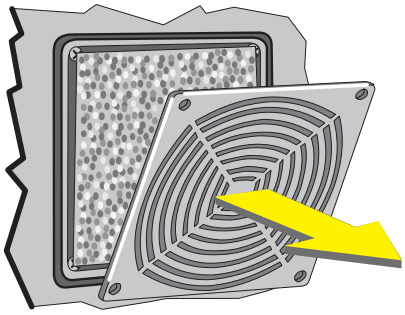
1 Power the Cytometer OFF.

2 Unplug both Power Supply power cords ❶ from the wall outlet.



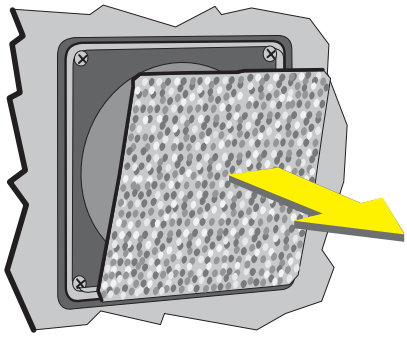
3 Pull off each filter cover. Even though the covers look like they are screwed in, they are not.

The filter covers are made of flexible plastic; they snap out when you pull them. Grab a segment of the grille between your thumb and index finger and then pull.



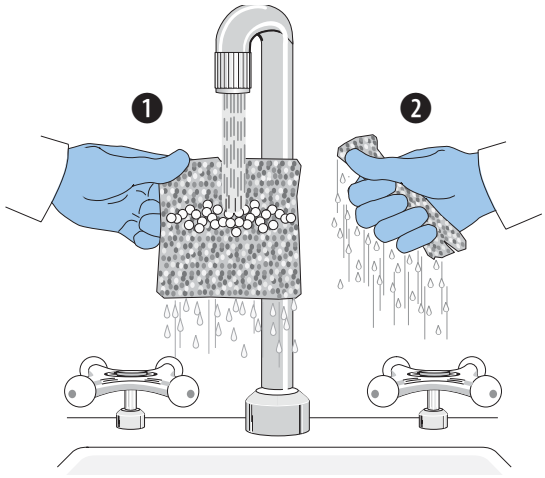
4 Gently pinch and pull out each filter.

Handle them gently to avoid damaging them.



Rinse and Return the Air Filters

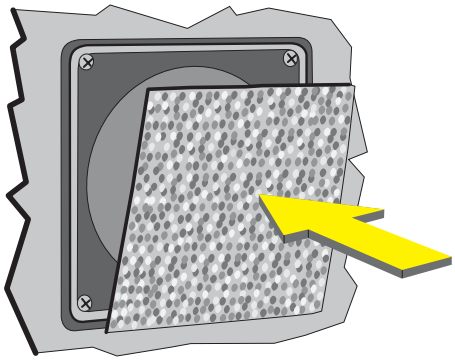
1 Rinse each filter in water ❶, and then wring it out ❷.



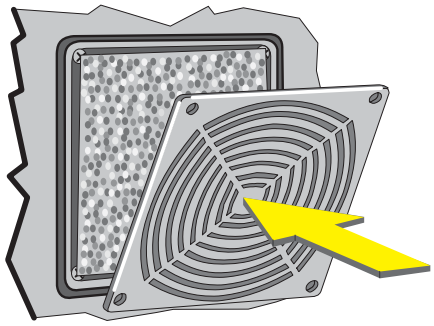
2 Set each filter aside and let it dry out for about 30 minutes.

Use paper towels to check that each filter is completely dry.

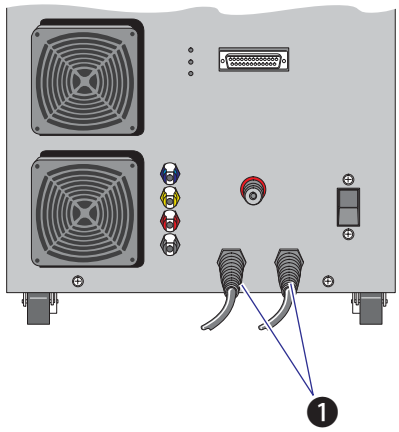
3 Return each filter into its holder. Replace any torn filters.



4 Put each filter cover back on.



5 Plug in both Power Supply power cords ❶ into the wall outlet.



6 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

7 Record that the air filters were cleaned on the electronic Maintenance Log.

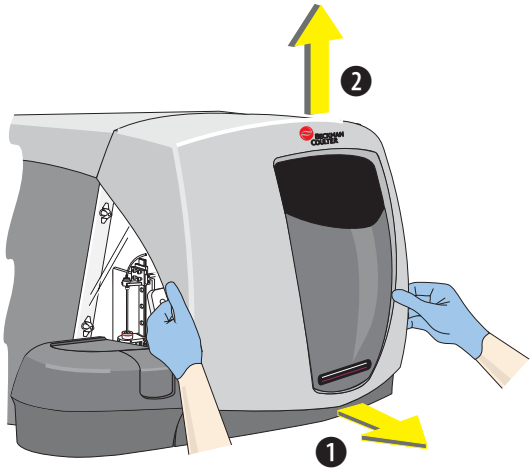
8 Perform the Daily Startup procedure before running samples.

1.4 OPEN/REMOVE THE INSTRUMENT COVERS

Open the Front Cover

Click ***SHOW ME*** for an overview.

1 Pull the front cover forward ❶ and then lift straight up ❷.



2 Push the front cover back until you hear both sides click and lock in place.

You only need to open the front cover this much if you are going to perform a procedure such as:

REMOVE THE REAGENT CONTAINERS

REPLACE THE REAGENT CONTAINERS

CLEAN THE SHEATH FLUID CONTAINER

CLEAN THE CLEANING AGENT CONTAINER

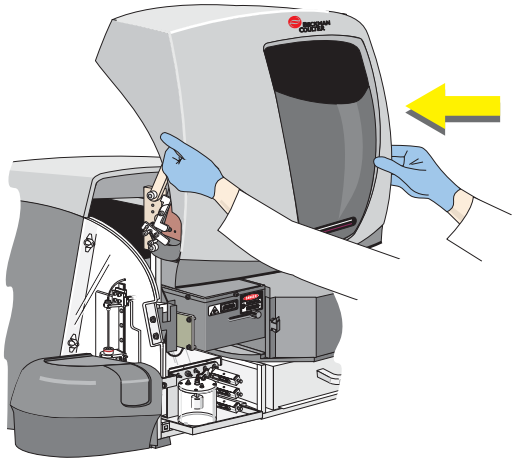
REPLACE THE SHEATH FLUID FILTER

FILL THE SHEATH FLUID CONTAINER

FILL THE CLEANING AGENT CONTAINER

VENT THE AIR BUBBLES

POSITION THE FIELD STOP.



3 If you need to perform:

CLEAN THE MCL SAMPLE HEAD AND THE SAMPLE PROBE

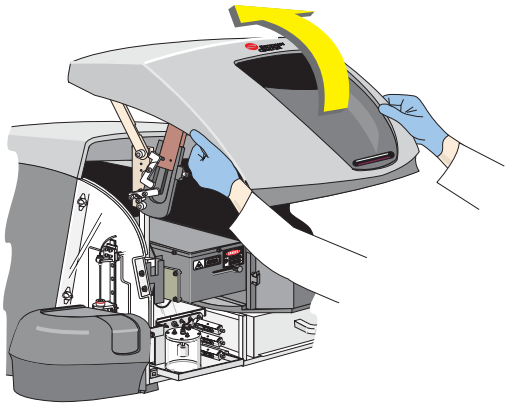
REPLACE THE SAMPLE PROBE AND SAMPLE PICKUP TUBING

REPLACE THE MCL SAMPLE HEAD

REPLACE THE OPTICAL FILTER PLATE

REPLACE A FILTER IN THE OPTICAL FILTER PLATE,

Pivot the front cover back until it is over the top of the instrument and you hear both sides click and lock in place.



Close the Front Cover

Click ***SHOW ME*** for an overview.

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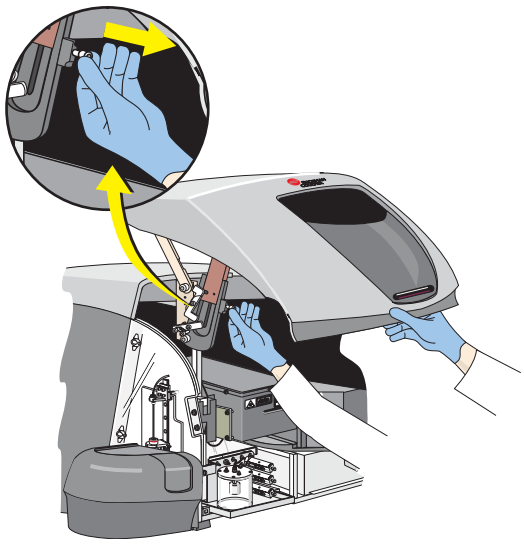
1 While holding the bottom of the front cover with one hand, pull out the release pin with your free hand.



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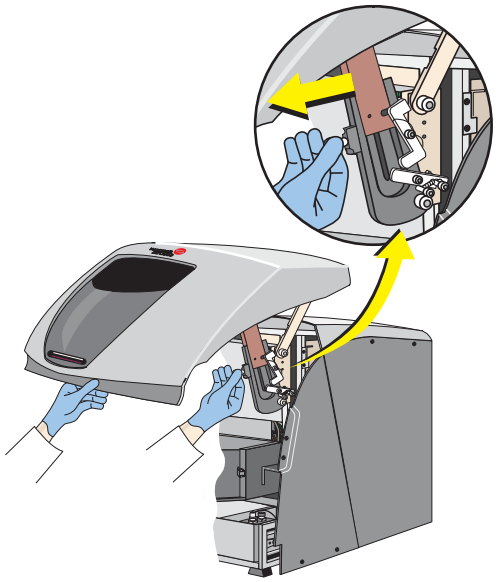
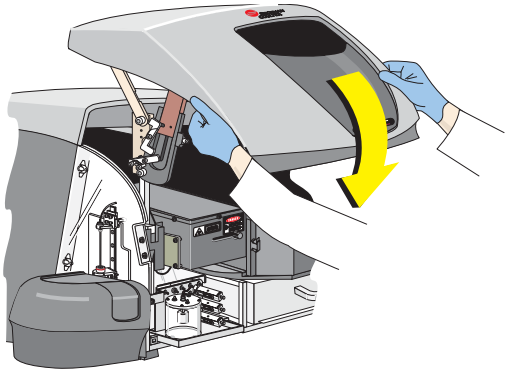
2 Switch hands so your other hand is holding the bottom of the front cover. Pull out the second release pin with your free hand.

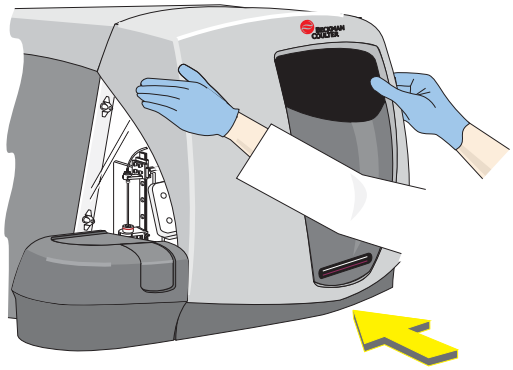


3 Using both hands, pivot the front cover forward until it is vertical.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

4 Ensure your fingers are not behind the cover. Push the cover down and in to close it.



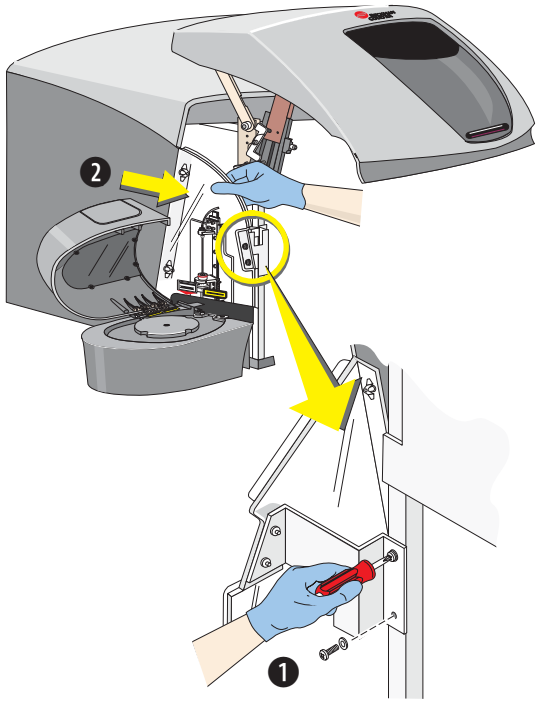
Remove the Front Left Side Panel

Click ***SHOW ME*** for an overview.

1 Power the Cytometer OFF.

2 Unscrew the two bolts that attach the left side panel to the front frame ❶.

3 Snap off the left side panel ❷.

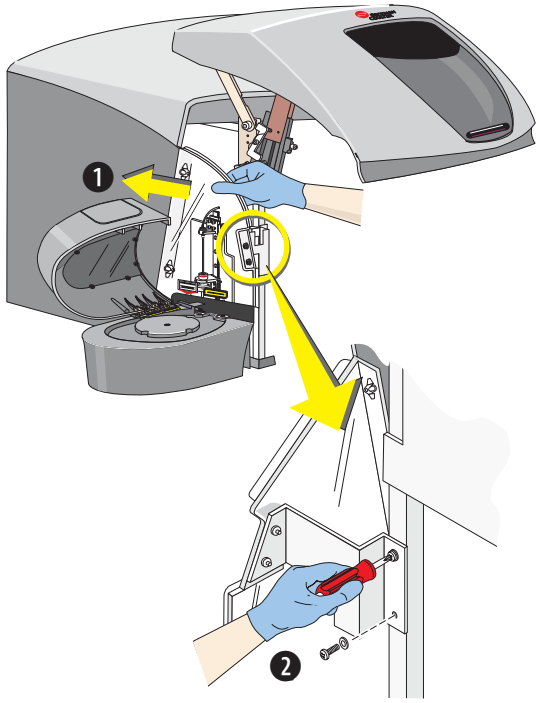


Replace the Front Left Side Panel

Click ***SHOW ME*** for an overview.

1 Snap on the left side panel ❶.

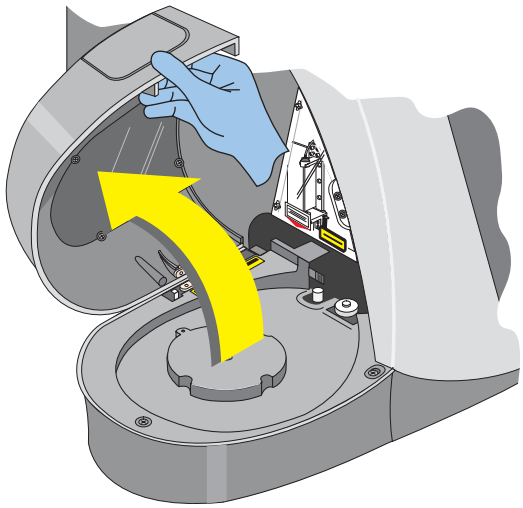
2 Screw in the two bolts to attach the left side panel to the front frame ❷.



3 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

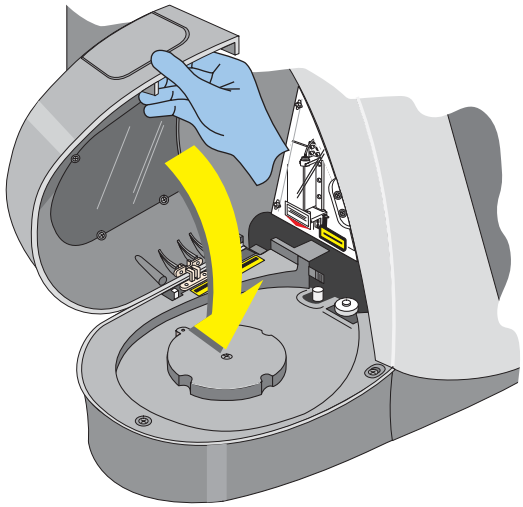
Open the MCL Cover

1 Lift up the MCL cover.



Close the MCL Cover

1 Close the MCL cover.



1.5 PUT THE CYTOMETER IN THE IDLE MODE

To clean, replace, or fill the reagent containers you need to put the Cytometer in the Idle mode.

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1 To put the Cytometer in the Idle mode:

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2 Wait about 10 seconds for the Cytometer to depressurize. The message *Press Idle Mode button to initialize* appears at the bottom of the screen when the Cytometer is depressurized.

1.6 REMOVE THE REAGENT CONTAINERS

Remove a reagent container to perform these procedures:

- Clean the sheath fluid container
- Clean the cleaning agent container
- Replace a reagent container. Clean any new reagent container before using it.

Procedure

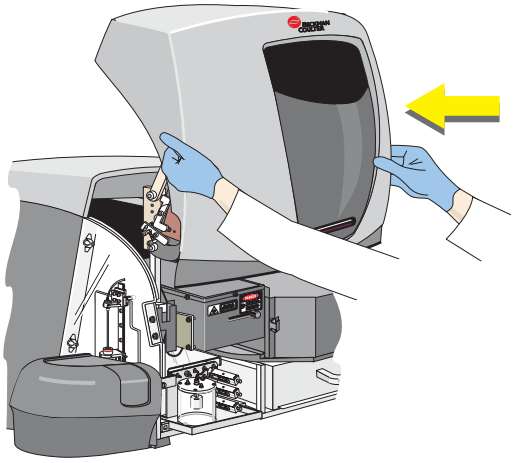
---

1 Check if the instrument is currently displaying the Idle mode:

- If yes (*Press Idle Mode button to initialize* appears), go to step 2.
- If no, PUT THE CYTOMETER IN THE IDLE MODE.

2 Open the Front Cover.

SHOW ME.



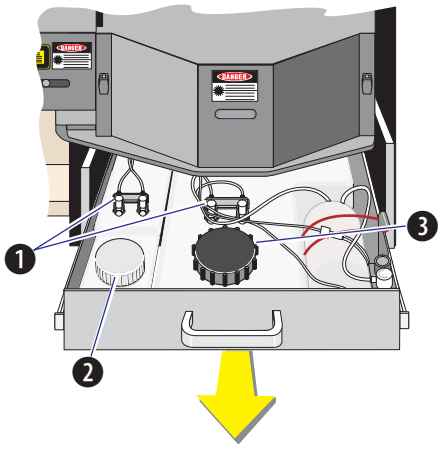
3 Pull open the reagent drawer until it stops.

❶ Reagent container connectors.

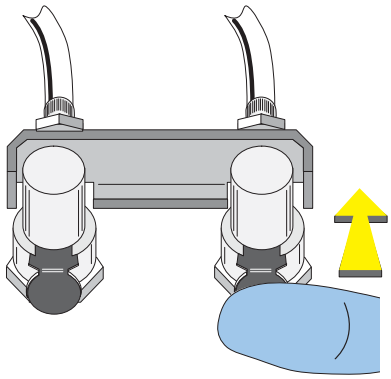
❷ Cleaning agent container.

❸ Sheath fluid container.

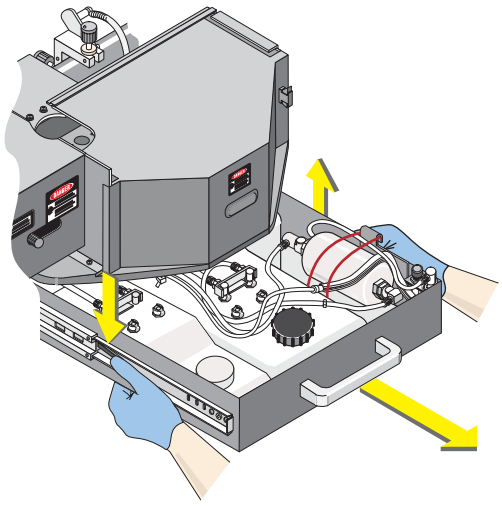
Note: The reagent drawer sits in a self-locking track so it only opens part way and stops.



4 Disconnect the tubing on the top of each reagent container by pushing in on the metal clips on the connectors.



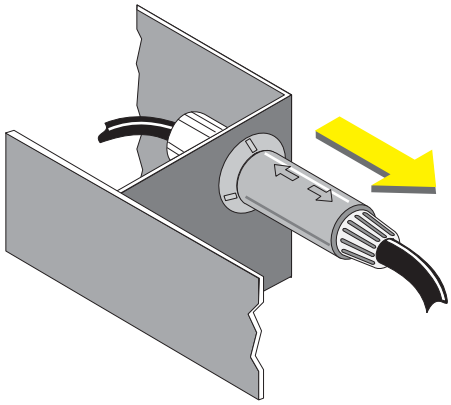
5 Press down on the left locking tab and press up on the right locking tab of the reagent drawer.



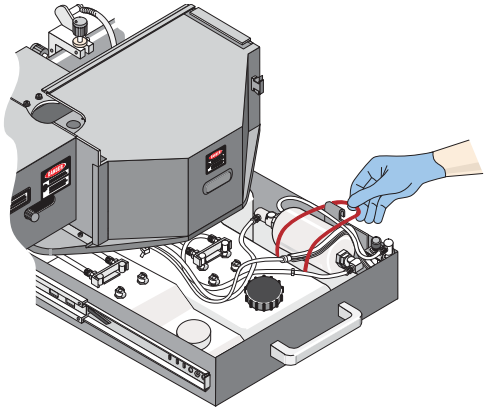
6 Pull open the reagent drawer farther out but not all the way.

7 Disconnect each sensor at the back of the drawer by sliding its sleeve out:

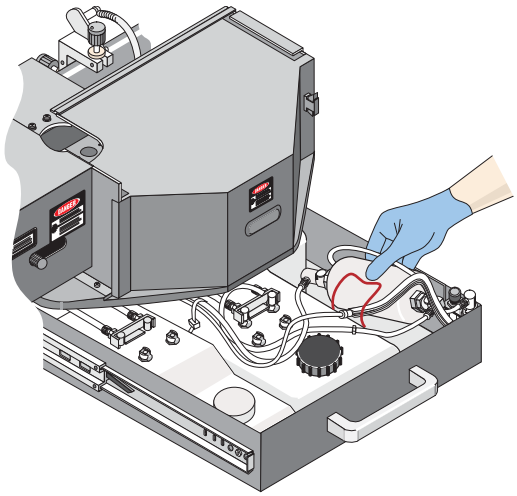
- The sensor for the sheath fluid container (shown here) is on the right.
- The sensor for the cleaning agent container is on the left.



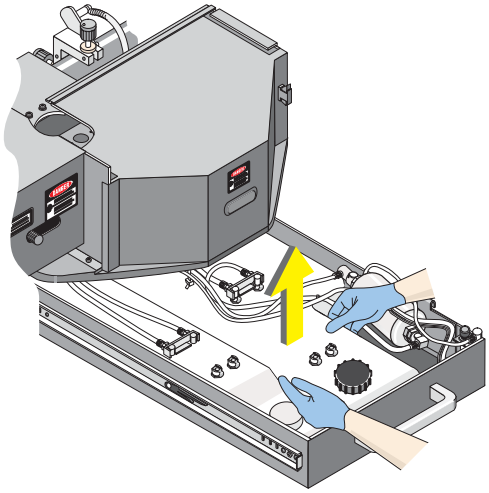
8 Unfasten the flexible strap that holds the sheath fluid filter in place.



9 Lift up the sheath filter to loosen its connected tubing.



10 Remove the container from the drawer, unscrew the cap and empty the container as completely as possible (sheath fluid container is shown).



11 Clean up any spills or debris in the drawer.

1.7 CLEAN THE SHEATH FLUID CONTAINER

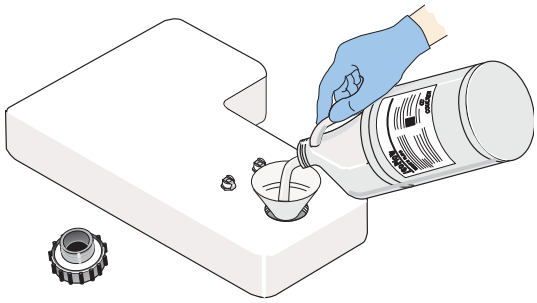
IMPORTANT Misleading results could occur if you contaminate the sheath fluid container. Be careful not to contaminate the sheath fluid container. Do not let your fingers, paper towels, or other objects touch the inside of the container or the inside of its cap.

- Remove and clean the sheath fluid container monthly. See Table 6.1, Cleaning Schedule in the Instructions For Use manual.
- Clean a new sheath fluid container before placing it into the reagent drawer.

1 See REMOVE THE REAGENT CONTAINERS to remove the sheath fluid container.

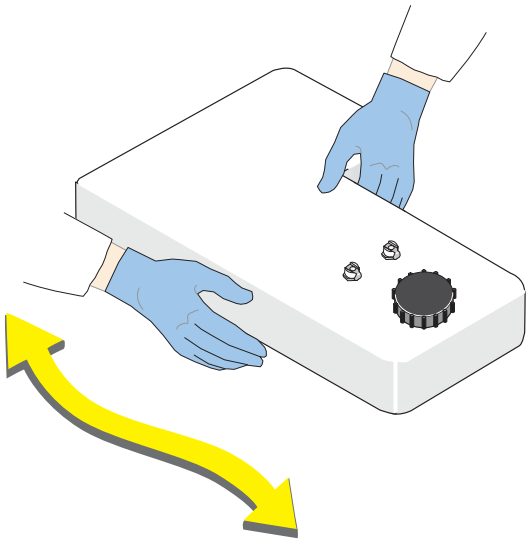
2 Position a funnel into the sheath fluid container.

Pour about 100 to 200 mL of fresh IsoFlow™ sheath fluid or equivalent into the sheath fluid container.



3 Screw the cap back on the sheath fluid container.

4 Swirl the sheath fluid in the sheath fluid container, rinsing all surfaces.



5 Empty the container as completely as possible.

6 Record that the sheath container was cleaned on the electronic Maintenance Log.

Monthly	
Clean Sheath Tank	

7 See REPLACE THE REAGENT CONTAINERS to replace the sheath fluid container.

1.8 CLEAN THE CLEANING AGENT CONTAINER

- Remove and clean the cleaning agent container every 60 days. See Table 6.1, Cleaning Schedule in the Instructions For Use manual.
- Clean a new cleaning agent container before placing it into the reagent drawer.

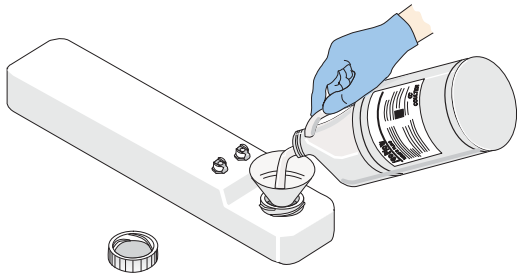
---

1 See REMOVE THE REAGENT CONTAINERS to remove the cleaning agent container.

---

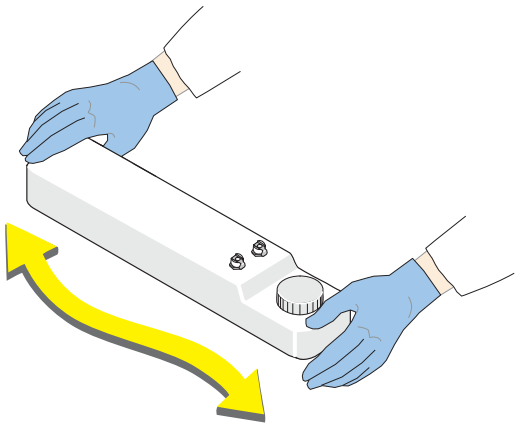
2 Position a funnel into the cleaning agent container.

Pour about 50 to 100 mL of fresh IsoFlow sheath fluid or equivalent into the cleaning agent container.



---

3 Screw the cap back on the cleaning agent container.



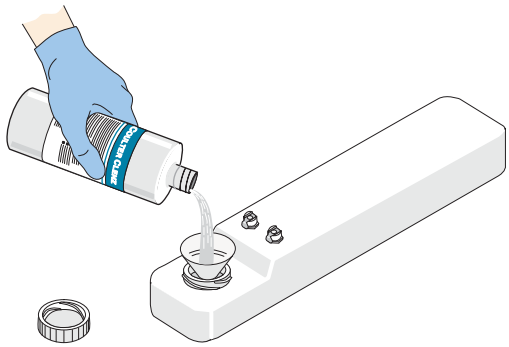
---

4 Swirl the sheath fluid in the sheath fluid container, rinsing all surfaces.

5 Empty the container as completely as possible.

6 Position a funnel into the cleaning agent container.

Pour about 50 to 100 mL of fresh COULTER CLENZ® cleaning agent or equivalent into the cleaning agent container.



7 Empty the container as completely as possible.

8 Record that the cleanse container was cleaned on the electronic Maintenance Log.

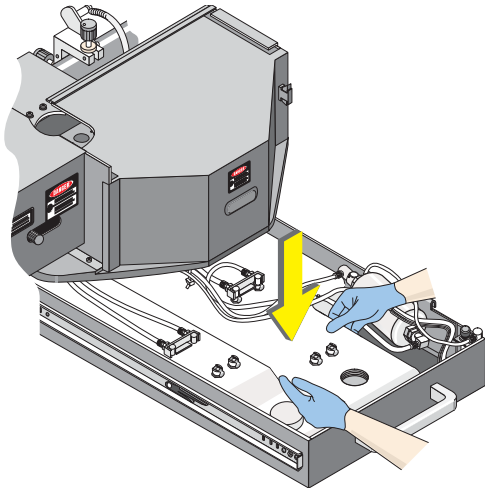
9 See REPLACE THE REAGENT CONTAINERS to replace the cleaning agent container.

1.9 REPLACE THE REAGENT CONTAINERS

Use this procedure to return a cleaned reagent container into the reagent drawer.

---

1 Put the clean reagent container back into the drawer.



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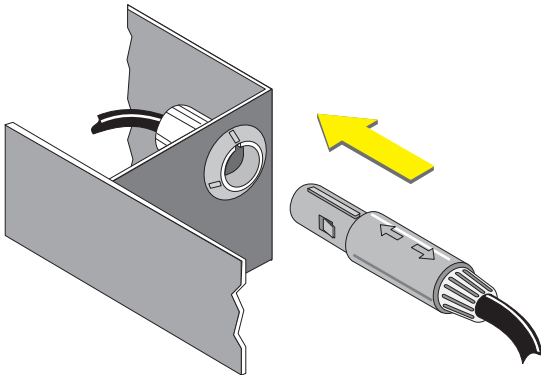
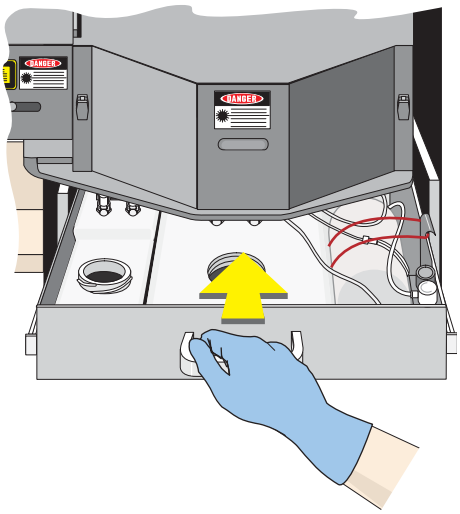
2 Check that the sensor connector at the back of the container goes through the hole in the back of the reagent drawer.

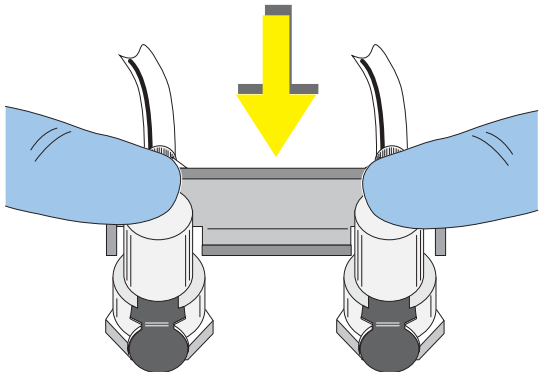
With the arrows visible on top of the sensor, reconnect the sensor (sheath fluid sensor is shown).



3 Slide the reagent drawer back in part way. Keep the neck of the reagent container out.



4 Reconnect the tubing assembly by pushing down on the tubing inserts so that the tubing snaps into the connector.

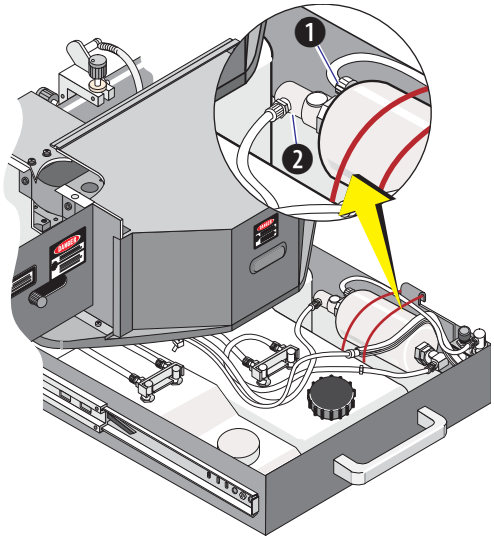


5 Fill each reagent container as instructed in these procedures:

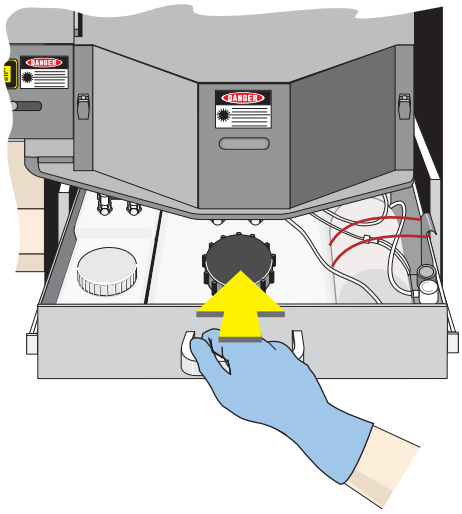
- FILL THE SHEATH FLUID CONTAINER and VENT THE AIR BUBBLES, or
- FILL THE CLEANING AGENT CONTAINER.

6 Check that:

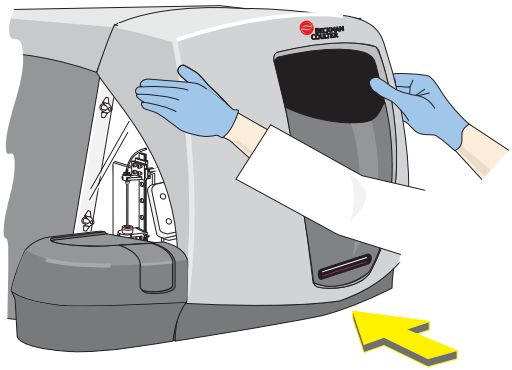
- The sheath filter vent port ❶ is above the connector ❷.
- The tubing is not kinked or twisted.



7 Close the reagent drawer.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.



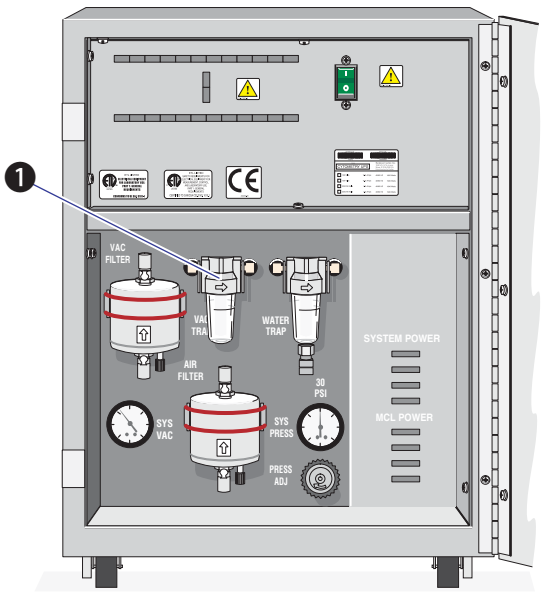
8 Close the Front Cover.

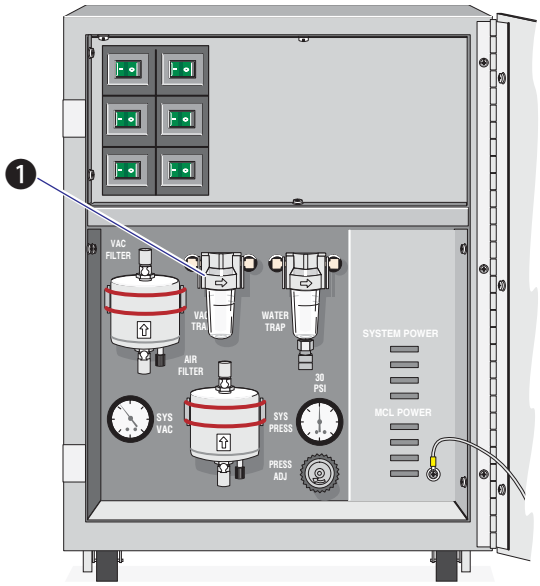
SHOW ME.

1.10 CLEAN THE VACUUM TRAP

- Clean the vacuum trap ❶ as needed.
- Check for fluid in the vacuum trap (VAC TRAP) on the front of the Power Supply as part of your Daily Startup procedure.
- If the vacuum trap is more than one-quarter full of fluid, empty it and rinse with tap water.

Instructions and graphics are given for both Power Supply configurations (shown below).





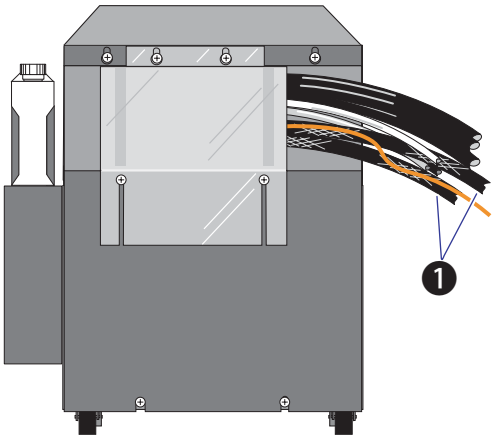
To clean the Vacuum Trap, perform these procedures:

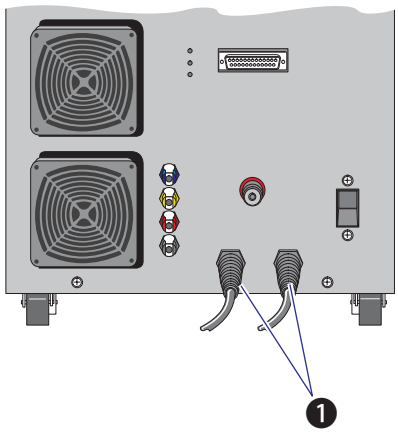
- Prepare to Clean the Vacuum Trap
- Find and Pull Out the Vacuum Trap
- Rinse and Return the Vacuum Trap to Its Bracket.

Prepare to Clean the Vacuum Trap

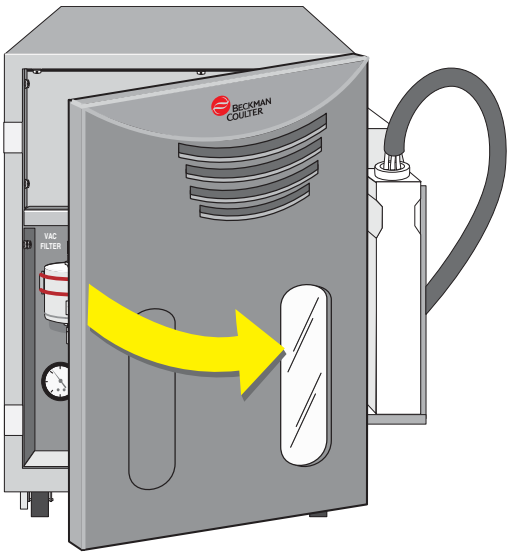
1 Power the Cytometer OFF.

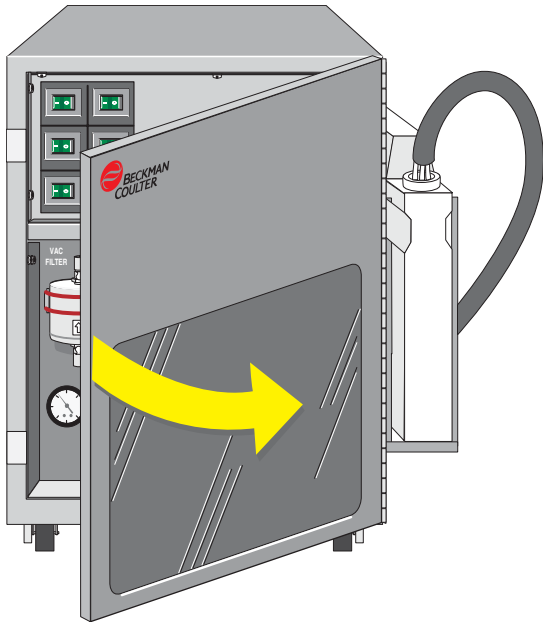
2 Unplug both Power Supply power cords ❶ from the wall outlet.





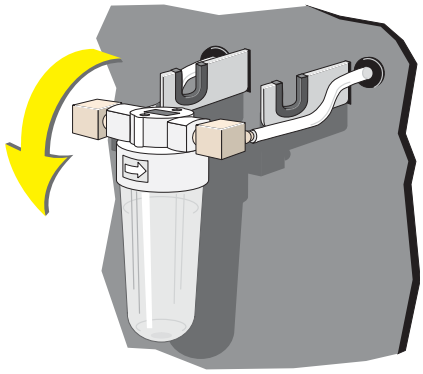
3 Open the Power Supply front door.



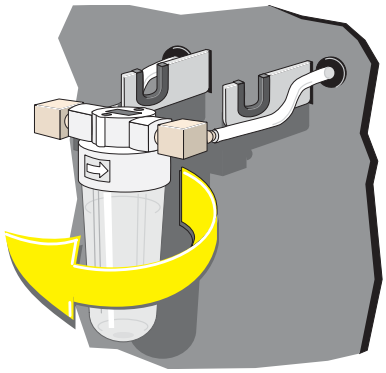


Find and Pull Out the Vacuum Trap

1 The vacuum trap is the trap on the left. Lift the vacuum trap assembly out of its bracket so that you can grasp the top of the assembly.



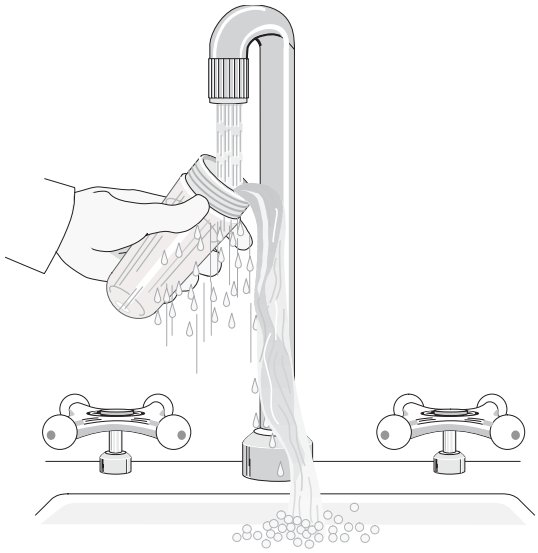
WARNING To prevent injury, avoid skin contact with the vacuum trap and its associated tubing. The vacuum trap and its associated tubing might contain residual biological material and must be handled with care. Clean up spills immediately. Dispose of the contents of the vacuum trap in accordance with your local environmental regulations and acceptable laboratory procedures.



2 While using one hand to hold the top of the vacuum trap assembly, use the other hand to unscrew the vacuum trap. Then, empty the vacuum trap according to your local environmental regulations and your laboratory's procedures.

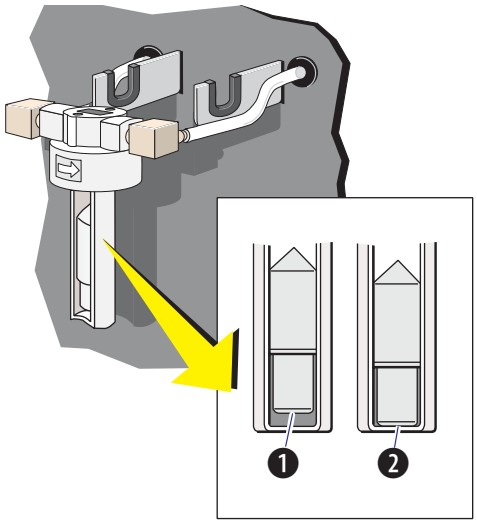
Rinse and Return the Vacuum Trap to Its Bracket

1 Rinse the vacuum trap with water, and then shake out the excess water.

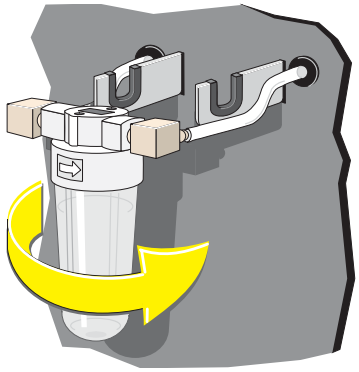


2 Insert the white center post, pointed end up, into the vacuum trap assembly.

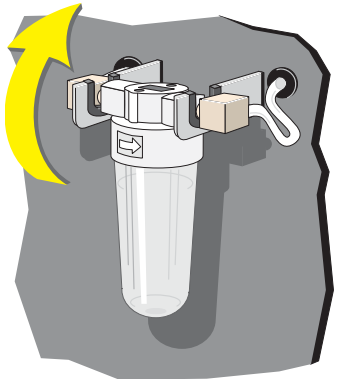
If the white center post in the vacuum trap assembly is stuck in the up position ❶, pull it into the down position ❷.



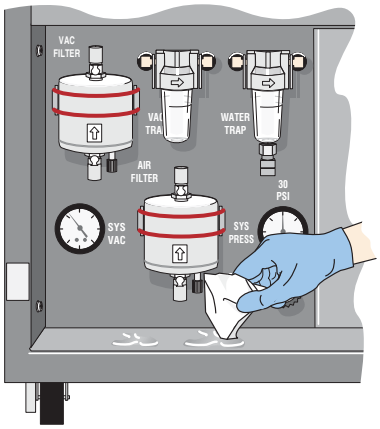
3 Carefully align the threads on the vacuum trap jar with the threads on the vacuum trap assembly and screw the vacuum trap back into place.



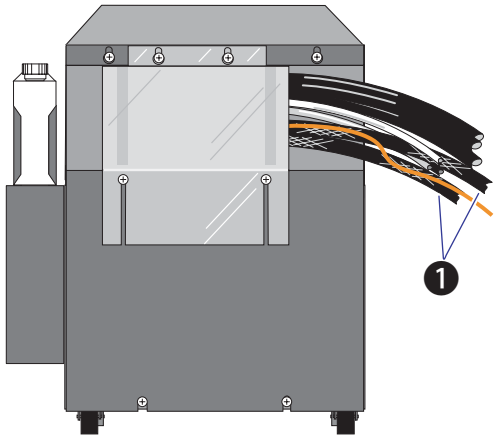
4 Return the vacuum trap assembly to its bracket.

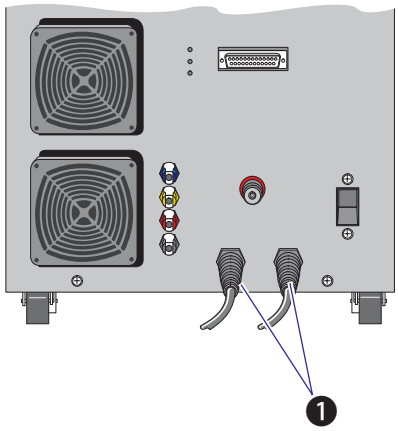


5 Wipe up any spills.



6 Plug in both Power Supply power cords ❶ into the wall outlet.





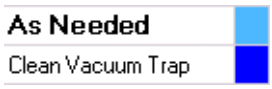
7 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

8 Check that no error messages are displayed.

Note: If an error message appears, see Table 6.2, Error Messages in the Instructions For Use manual for possible causes and operator actions.

9 *Awaiting Sample* appears at the bottom of the screen when system initialization is done.

10 Record that the vacuum trap was cleaned on the electronic Maintenance Log.



11 Perform the Daily Startup procedure before running samples.

1.11 CLEAN THE SAMPLING SYSTEM

Routine daily cleaning helps to minimize instrument downtime.

Levels of System Cleaning

The two levels of cleaning for the system are:

- Routine cleaning followed by sample head/probe cleaning.
- Vacuum line cleaning.

When to Clean the Sampling System

Routine and Sample Head Cleaning Procedures

Perform both the routine and the sample head/probe cleaning procedures:

- When you change laboratory application procedures, especially if you are using vital fluorescent stains. If vital stains such as propidium iodide, ethidium bromide, acridine orange, thiazole orange, Coriphosphine-O, Fura 3, or fluorescein diacetate, are used, perform these cleaning procedures immediately after using the dyes.
- Immediately prior to running any immunophenotyping application if vital stains are being used on the same instrument.
- When you observe a significant increase in debris or background counts.
- Before you perform the Vacuum Line Cleaning Procedure.
- Before you perform Daily Shutdown.

Vacuum Line Cleaning

Perform the vacuum line cleaning procedure:

- When you change laboratory application procedures, especially if you are using vital fluorescent stains. If vital stains such as propidium iodide, ethidium bromide, acridine orange, thiazole orange, Coriphosphine-O, Fura 3, or fluorescein diacetate, are used, perform these cleaning procedures immediately after using the dyes.
- After every 8 hours of continuous operation.
- Before you perform Daily Shutdown.

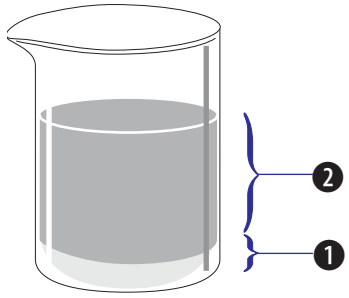
Routine Cleaning Procedure

Perform this procedure as often as described in the heading When to Clean the Sampling System.

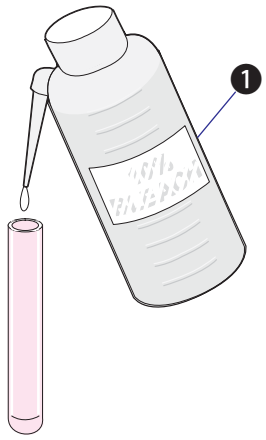
WARNING The cleaning solution is hazardous and can cause personal injury or damage clothing. Beckman Coulter urges its customers to comply with all national health and safety standards such as the use of barrier protection. This may include, but it is not limited to, protective eyewear, gloves, and suitable laboratory attire when operating or maintaining this or any other automated laboratory analyzer.

IMPORTANT A cleaning solution that is not fresh can leave residual stain in the system and misleading results could occur when you change laboratory applications. Be sure to prepare a fresh cleaning solution before performing the cleaning procedure and use it within the same day.

1 Prepare a cleaning solution of 1 part high-quality, fragrance-free bleach ❶ (5% or 6% solution of sodium hypochlorite - available chlorine) and 9 parts distilled water or IsoFlow sheath fluid ❷.



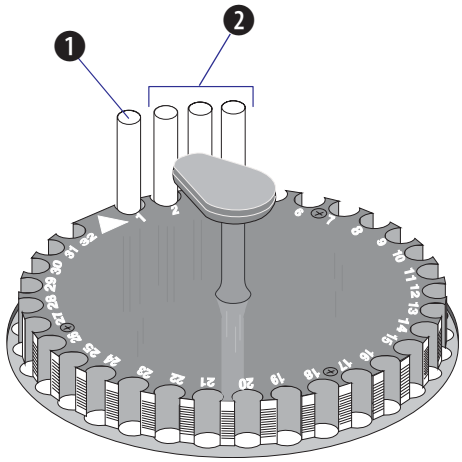
2 Put 2 mL of the bleach solution ❶ in a test tube.



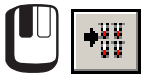
3 Load the carousel:

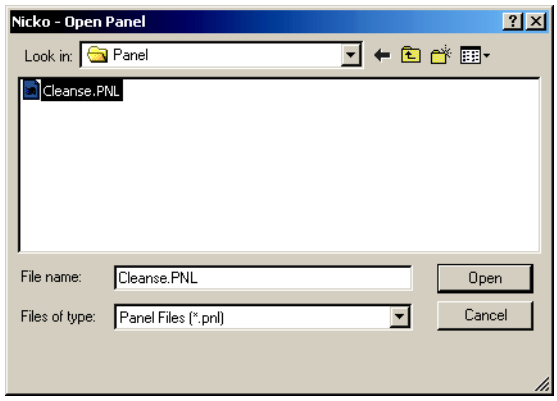
❶ Put the test tube of bleach solution into carousel position 1.

❷ Put three freshly prepared tubes, each containing about 2 mL of distilled water or IsoFlow sheath fluid, into positions 2, 3, and 4 of the carousel.



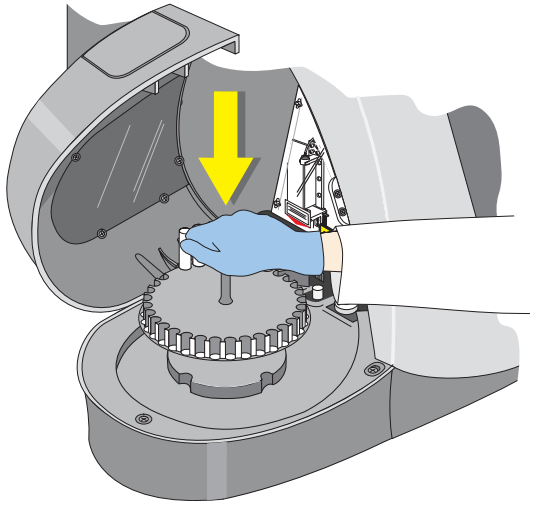
4 Select the cleaning panel if it is not currently selected:

-  .
- Select **Cleanse.PNL** from the list of panels.
-  .



5 Put the carousel into the MCL sample loader.

Close the MCL cover.



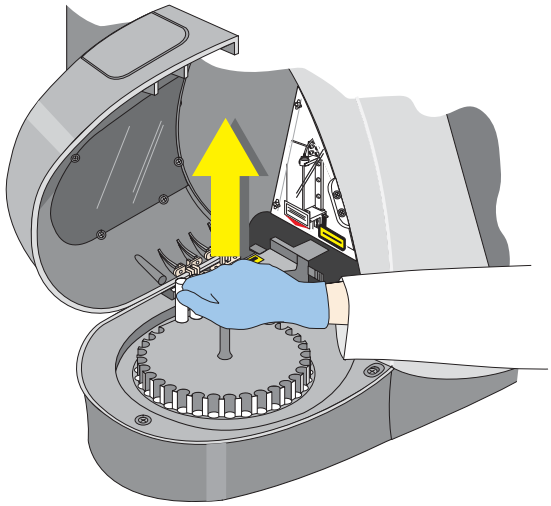
- Enter the **Carousel No.** in the Worklist. The tube **Location** numbers automatically appear.

Carousel No.	Location
22	1
22	2
22	3
22	4

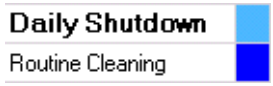
6  .

7 When the cleaning panel is done, remove the carousel.

8 Close the MCL cover.



9 Record that the routine cleaning procedure was performed on the electronic Maintenance Log.



10 Before running samples:

to initialize the system.

Testing for Residual Stain

If you use vital stains such as propidium iodide, ethidium bromide, acridine orange, thiazole orange, Coriphosphine-O, Fura 3, or fluorescein diacetate, you may want to test for residual stain after performing the routine cleaning procedure and before proceeding to your next application.

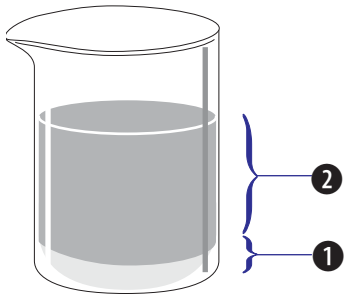
To test for residual stain, run unstained Immuno-Trol™ cells or CYTO-TROL™ control cells for your application to ensure that the autofluorescent population is where you normally expect it. If it is not, repeat the routine cleaning procedure.

MCL Sample Head and Sample Probe Cleaning Procedure

Perform this procedure as often as described in the heading When to Clean the Sampling System.

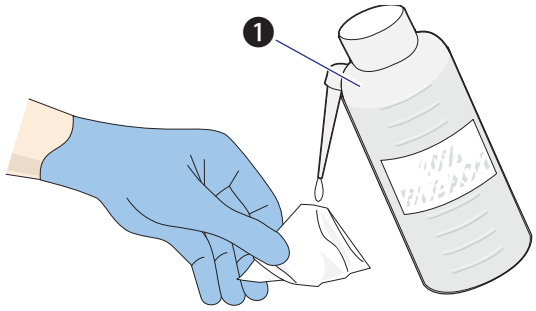
---

1 Prepare a cleaning solution of 1 part of high-quality, fragrance-free bleach ❶ (5% or 6% solution of sodium hypochlorite - available chlorine) and 9 parts distilled water or IsoFlow sheath fluid ❷.



---

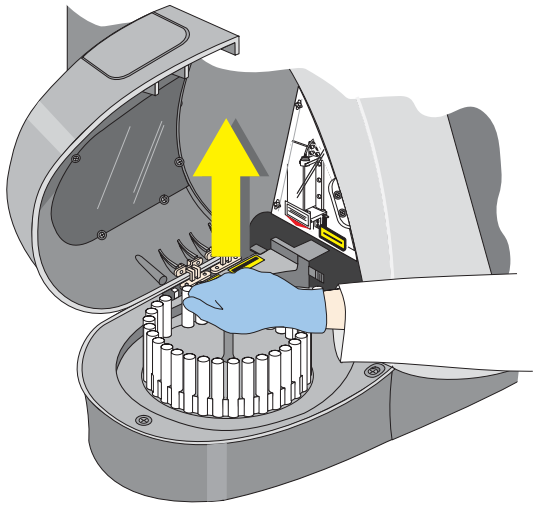
2 While wearing suitable laboratory protective gloves, apply the 10% bleach solution ❶ to a gauze pad.



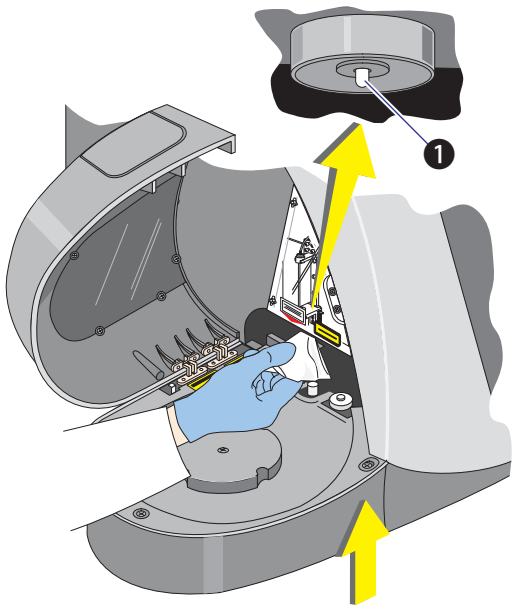
---

3 Open the MCL cover.

Note: If a carousel is present, remove it.



4 Carefully push the moistened gauze pad up against the inside of the MCL sample head ❶ and scrub away any debris inside and around the sample probe.



5 Continue scrubbing the sample head and probe by pushing the head up and down 10 times during a 60-second period. Replace moistened gauze as needed.

6 Rinse the MCL sample head and probe with gauze moistened with water.

7 Record that the sample head cleaning procedure was performed on the electronic Maintenance Log.

Weekly	
Clean Air Filters	
Clean MCL Head/Probe	

8 Perform the Vacuum Line Cleaning Procedure.

Vacuum Line Cleaning Procedure

Perform this procedure as often as described in the heading When to Clean the Sampling System.

---

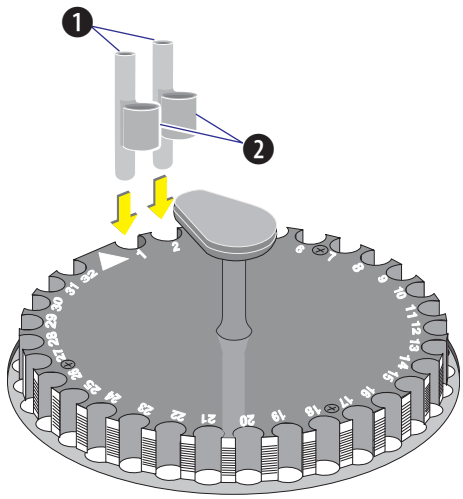
1 Put 5 mL of distilled water into the fill reservoir of two cleaning adaptors.

---

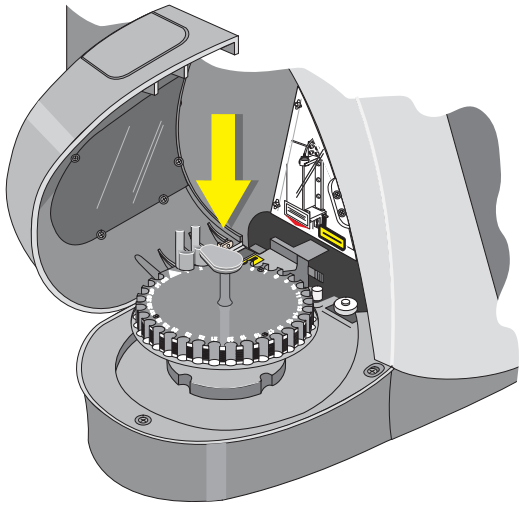
2 Load the cleaning adaptors into a carousel:

❶ Put the cleaning adaptors into positions 1 and 2 of the carousel.

❷ Position the fill reservoirs toward the center of the carousel.



3 Put the carousel into the MCL and close the MCL cover.



4  .

5 When the message *Press Idle Mode button to Initialize* appears at the bottom of the screen:

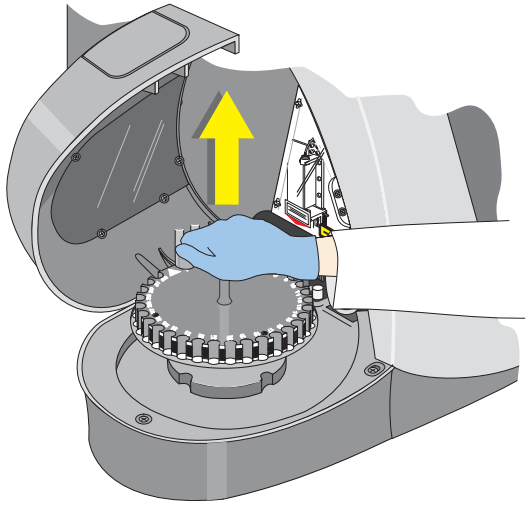
 .

6 The message *Cleanse cycle in progress* appears during the cleaning cycle.

When the cleaning cycle is done, the message changes back to *Press Idle Mode button to Initialize*.

7 Remove the carousel.

8 Close the MCL cover.



9 Record that the vacuum line cleaning procedure was performed on the electronic Maintenance Log.

Sample Head/Probe	
Vacuum Line Clean	

10 Before running samples:

to initialize the system.

1.12 CLEAN THE MCL SAMPLE HEAD AND THE SAMPLE PROBE

Do this procedure weekly to remove any crystal or debris buildup. To see a video of this condition, click ***SHOW ME.***

Click ***SHOW ME*** for an overview.

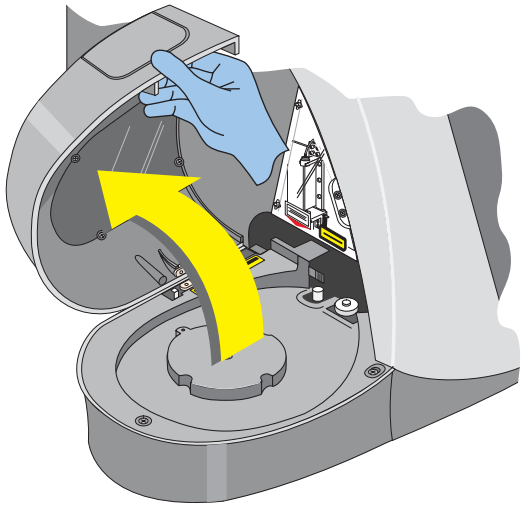
---

1 Power the Cytometer OFF.

---

2 Lift up the MCL cover.

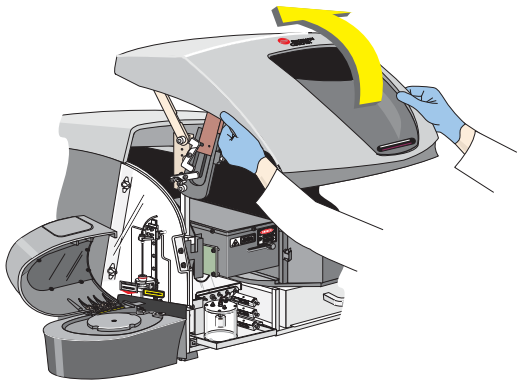
Note: If a carousel is present, remove it.



---

3 Open the Front Cover.

SHOW ME.

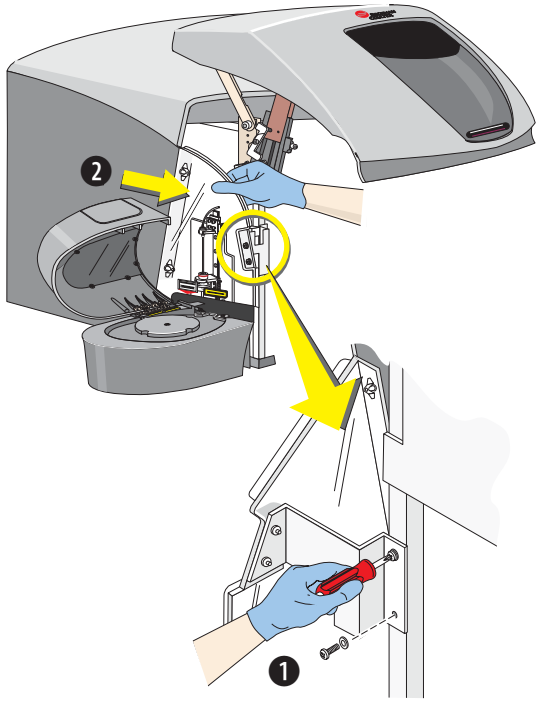


4 Remove the Front Left Side Panel:

❶ Unscrew the two bolts that attach the left side panel to the front frame.

❷ Snap off the left side panel.

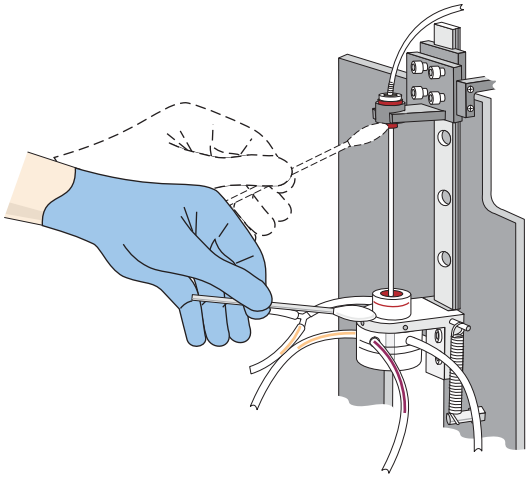
SHOW ME.



5 Moisten a Q-tip with distilled water.

SHOW ME.

6 Clean the top of the MCL sample head and the bottom of the sample probe holder.

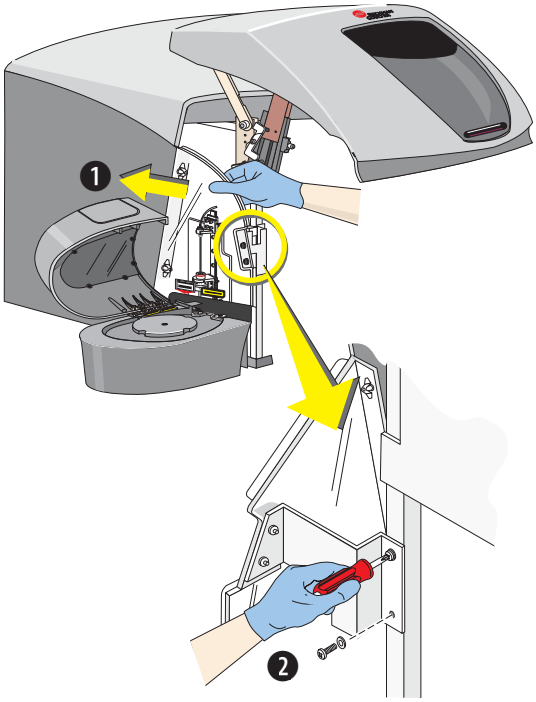


7 Replace the Front Left Side Panel:

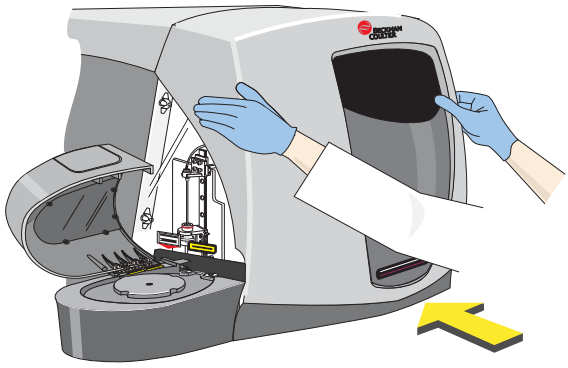
❶ Snap on the left side panel.

❷ Screw in the two bolts to attach the left side panel to the front frame.

SHOW ME.



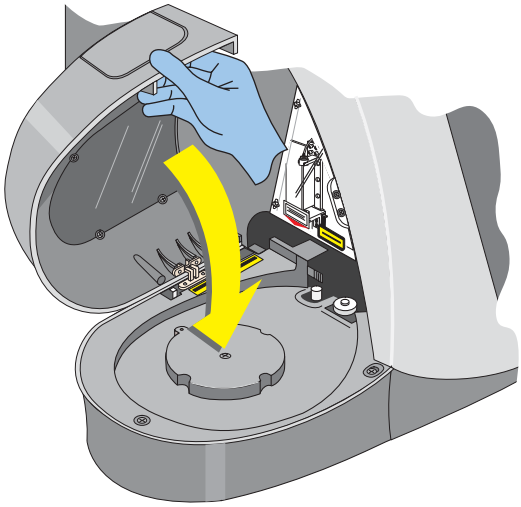
WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.



8 Close the Front Cover.

SHOW ME.

9 Close the MCL cover.



10 Record that the sample head cleaning procedure was performed on the electronic Maintenance Log.

11 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

1.13 POWER THE CYTOMETER ONLY ON/OFF

Use the procedures below if the instrument has not been fully shut down.

Otherwise use these more detailed procedures located in the Instructions For Use manual:

- Use the Power the Computer and Cytometer ON procedure if you need to start up the instrument and computer from a fully shut down condition.
- Use the Power the Computer and Cytometer OFF procedure if you need to fully shut down the instrument and the computer.

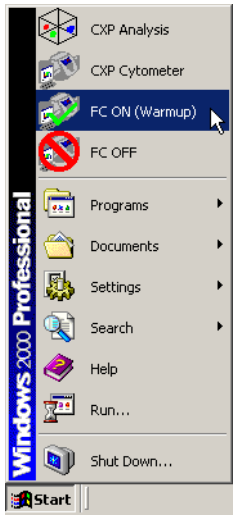
Power the Cytometer Only ON

Use this procedure if the computer is already on and you do not need to start the CXP software.

---

1 On the Windows desktop:

to power up ONLY the Cytometer.



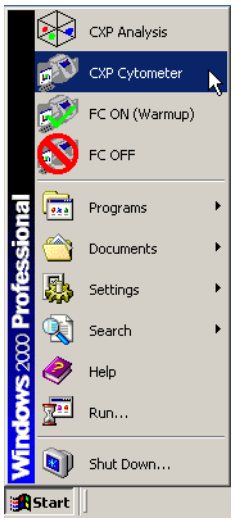
Power the Cytometer and CXP Software ON

Use this procedure if the computer is already on and you want to start the Cytometer and the CXP software.

---

1 On the Windows desktop:

to start the CXP software and power up the Cytometer.



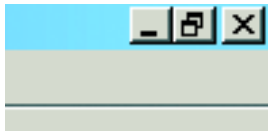
Power the Cytometer OFF

Use this procedure to turn off the Cytometer and close the CXP software.

You can still work with the Windows® software after the Cytometer shuts off.

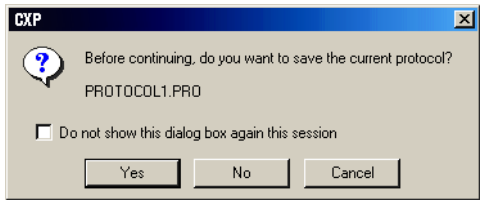
---

1 in all open CXP windows.



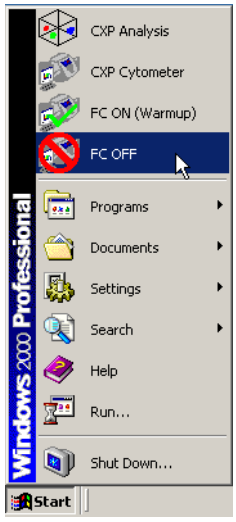
---

2 Yes or No.



---

3 Start ▸▸ to turn off the Cytometer.



2.1 WHAT THIS CHAPTER EXPLAINS

List of Replacement and Adjustment Procedures

This chapter has these replacement and adjustment procedures:

- REPLACE REAGENTS
- FILL THE SHEATH FLUID CONTAINER
- VENT THE AIR BUBBLES
- FILL THE CLEANING AGENT CONTAINER
- EMPTY THE WASTE CONTAINER
- REPLACE THE SHEATH FLUID FILTER
- REPLACE THE SAMPLE PROBE AND SAMPLE PICKUP TUBING
- REPLACE THE MCL SAMPLE HEAD
- ADJUST THE SYSTEM PRESSURE
- REPLACE THE OPTICAL FILTER PLATE
- REPLACE A FILTER IN THE OPTICAL FILTER PLATE
- POSITION THE FIELD STOP
- RESET THE CIRCUIT BREAKERS
- ADJUST THE HENE LASER.

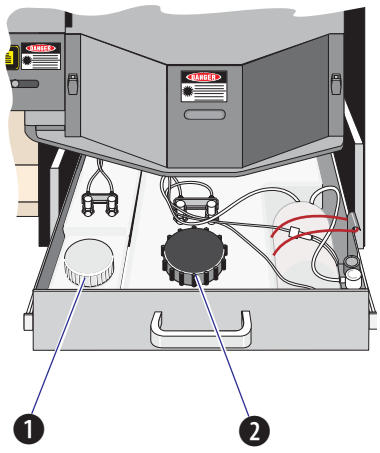
2.2 REPLACEMENT/ADJUSTMENT SCHEDULE

See the Replacement Schedule in the TROUBLESHOOTING Chapter in the Instructions For Use manual.

2.3 REPLACE REAGENTS

About the Reagent Containers

- The Cytometer has a reagent drawer that has containers for cleaning agent ❶ and sheath fluid ❷.
- For best use of reagents, refill the reagent containers only when the instrument indicates that they are low.
- If you replace a reagent container, clean it before you put it into the instrument and fill it. See CLEAN THE SHEATH FLUID CONTAINER or CLEAN THE CLEANING AGENT CONTAINER.



Reagent Container Capacity

The sheath fluid container has a working capacity of about 2 L. This is the amount of reagent needed when you are filling the sheath fluid container after the **Sheath Low** indicator appears. When you fill a completely empty sheath fluid container (after cleaning or replacement), you need about 2.8 L of sheath fluid due to pressurization and level sensing requirements.

Note: A bottle of IsoFlow sheath fluid holds 1.8 L.

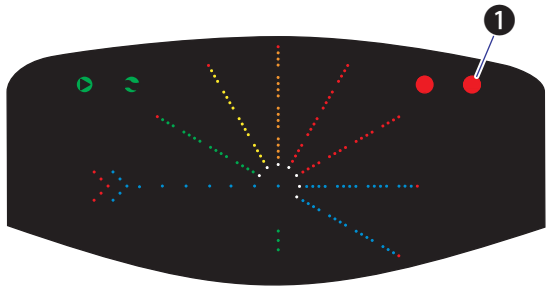
The cleaning agent container has a working capacity of about 500 mL. This is the amount of reagent needed when you are filling the sheath fluid container after *Cleanse Level Warning or Cleanse Level Error* appears. When you fill a completely empty cleaning agent container (after cleaning or replacement), you need about 1 L of cleaning agent due to pressurization and level sensing requirements.

Note: A bottle of COULTER CLENZ cleaning agent holds 500 mL.

2.4 FILL THE SHEATH FLUID CONTAINER

Perform this procedure whenever:

- You clean or replace the sheath fluid container.
- The **Sheath Low** indicator ❶ appears.
- The *Sheath Level Warning* or *Sheath Level Error* appears.

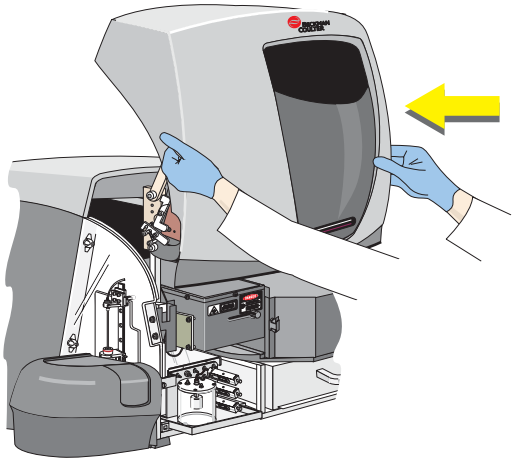


1 Check if the instrument is currently in the Idle mode:

- If yes (*Press Idle Mode button to initialize* appears), go to step 3.
- If no, PUT THE CYTOMETER IN THE IDLE MODE.

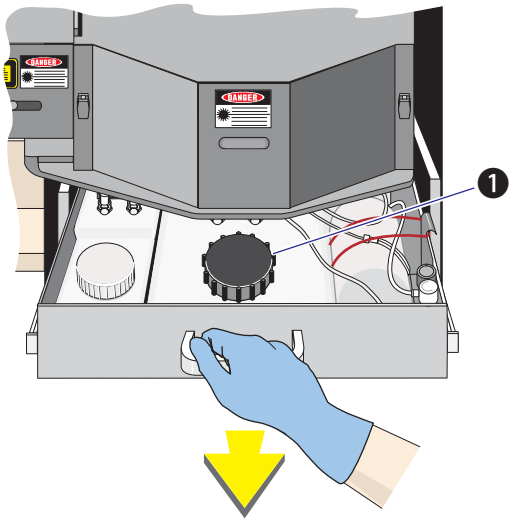
2 Open the Front Cover.

SHOW ME.

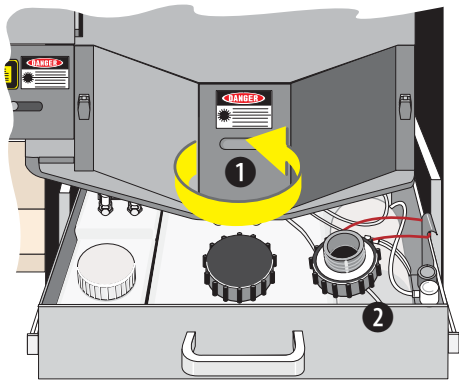


3 Pull open the reagent drawer until it stops.

Locate the sheath fluid container ❶.



IMPORTANT Misleading results could occur if you contaminate the sheath fluid. Be careful not to contaminate the sheath fluid. Do not let your fingers, paper towels, or other objects touch the inside of the container or the inside of its cap.

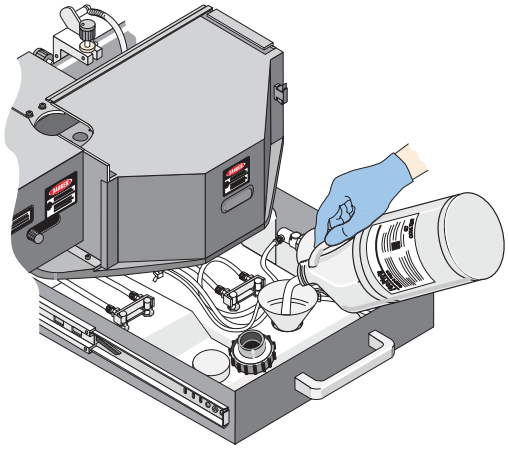


4 Remove the cap:

❶ Unscrew the cap on the sheath fluid container.

❷ To avoid contaminating the sheath fluid, lay the cap upside down on the container.

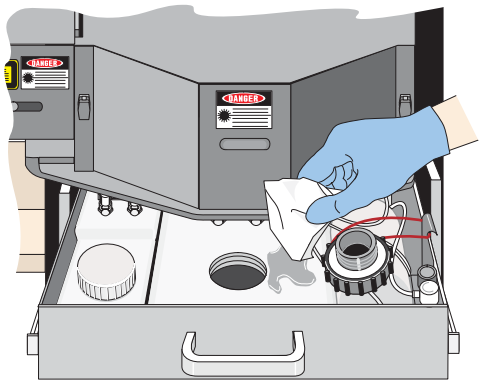
CAUTION To prevent damage to the instrument, do not overfill the sheath fluid container. Avoid spills. Do not tilt the container or remove it from the drawer to fill it.



5 Position a funnel into the sheath fluid container.

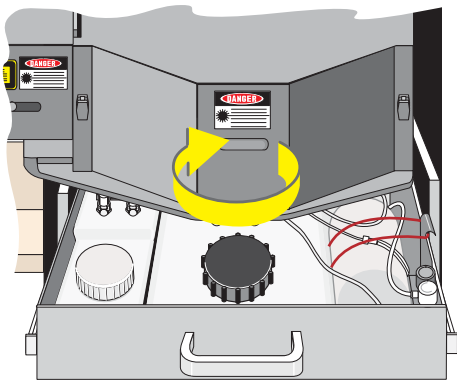
6 Carefully pour sheath fluid into the sheath fluid container, filling it just to the bottom of its neck.

7 Carefully wipe up any spills.

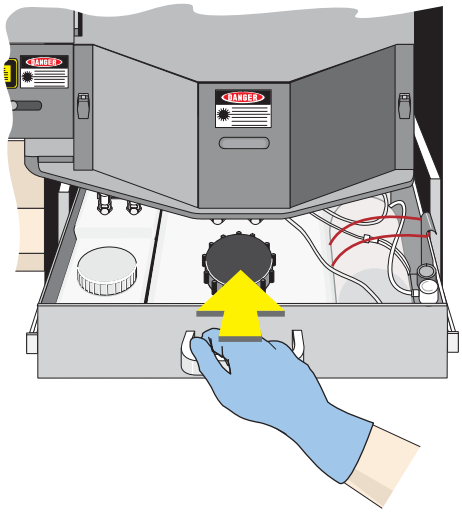


IMPORTANT Misleading results could occur if you analyze samples without the cap on the sheath container. Be sure to put the cap back on the sheath fluid container after you fill it.

8 Screw the cap back on.



9 Close the reagent drawer and perform the VENT THE AIR BUBBLES procedure.



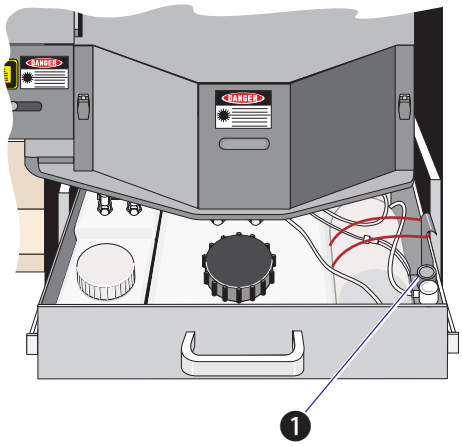
2.5 VENT THE AIR BUBBLES

Perform this procedure:

- After you fill the internal sheath fluid container
- After you replace the sheath fluid filter
- When you are troubleshooting and suspect bubles in the sheath fluid tubing.

Note:

- The vent button ❶ lets you release bubbles that are in the sheath filter and in the tubing for the sheath fluid.
- While the reagent drawer is open, the vent button in the drawer is deactivated.
- You can only vent the air bubbles when the reagent drawer is closed and the Cytometer is initializing or in the **Run** or **Prime** mode.



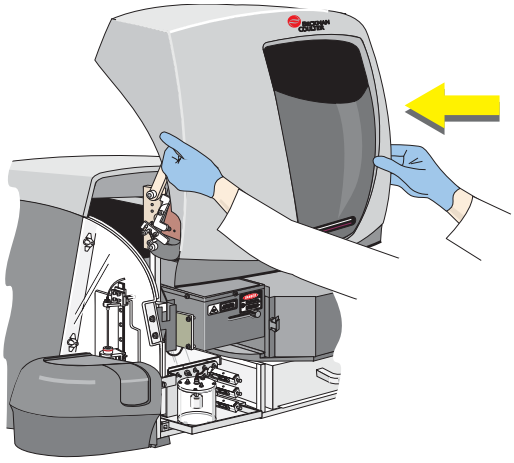
Procedure

1 Proceed as follows:

- If you have just replaced the sheath fluid or sheath fluid filter, go to step 3.
- If you are troubleshooting a problem and you suspect bubbles in the sheath fluid tubing, go to step 2.

2 Open the Front Cover.

SHOW ME.

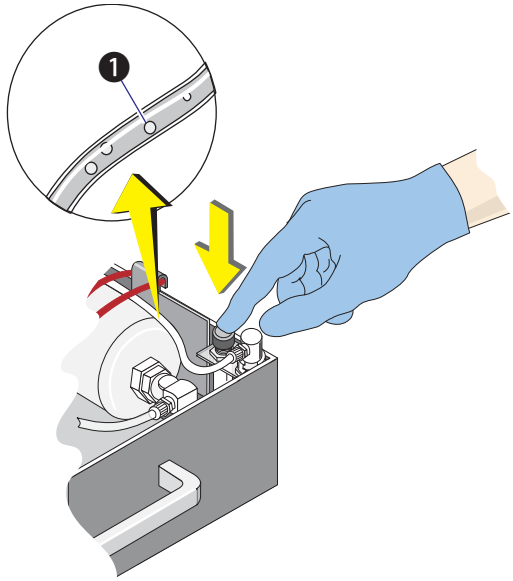


3 Initialize the instrument if you just replaced the sheath fluid or sheath fluid filter:

OR,

If you are troubleshooting:

4 Press and hold the vent button until the bubbles in the vent tubing ❶ are gone.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

5 Close the Front Cover.

SHOW ME.

2.6 FILL THE CLEANING AGENT CONTAINER

Perform this procedure whenever *Cleanse Level Warning* or *Cleanse Level Error* appears.

---

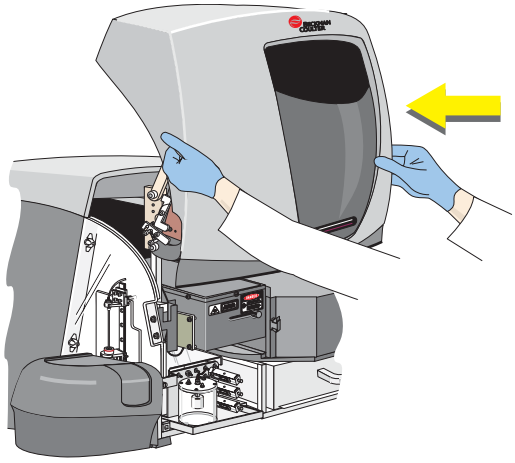
1 Check if the instrument is currently displaying the Idle mode:

- If yes (*Press Idle Mode button to initialize* appears), go to step 2.
- If no, PUT THE CYTOMETER IN THE IDLE MODE.

---

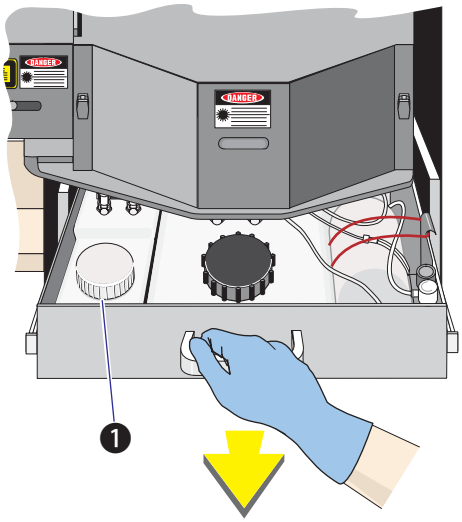
2 Open the Front Cover.

SHOW ME.



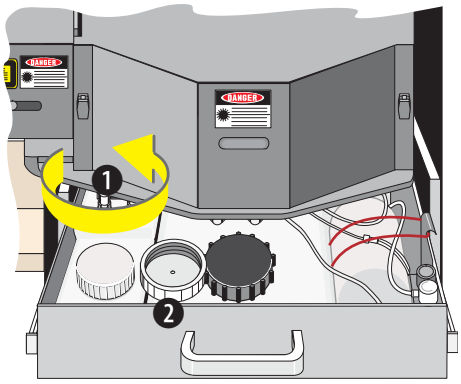
3 Pull open the reagent drawer until it stops.

Locate the cleaning agent container ❶.

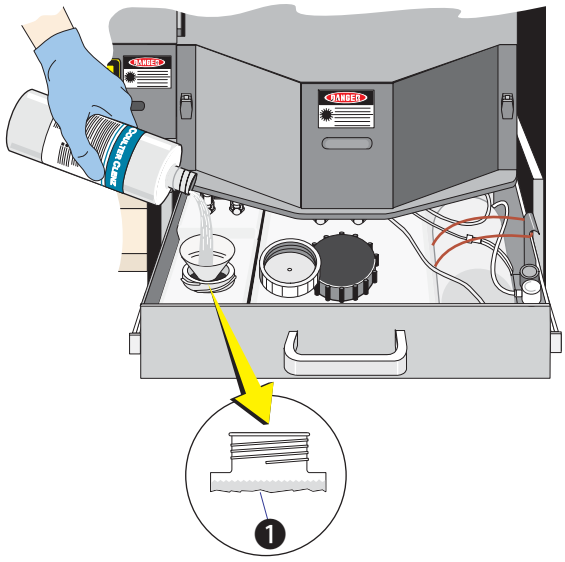


IMPORTANT Misleading results could occur if you contaminate the cleaning agent. Be careful not to contaminate the cleaning agent. Do not let your fingers, paper towels, or other objects touch the inside of the container or the inside of its cap.

4 Unscrew the cap on the cleaning agent container ❶. To avoid contaminating the cleaning agent, lay the cap upside down on the container ❷.



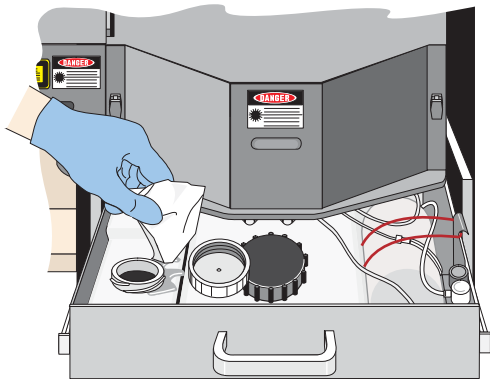
CAUTION Risk of damage to the instrument if you overfill the cleaning agent container. Overfilling the cleaning agent container causes the cleaning agent to enter the pressurized line. Avoid spills. Do not tilt the container or remove it from the drawer to fill it.



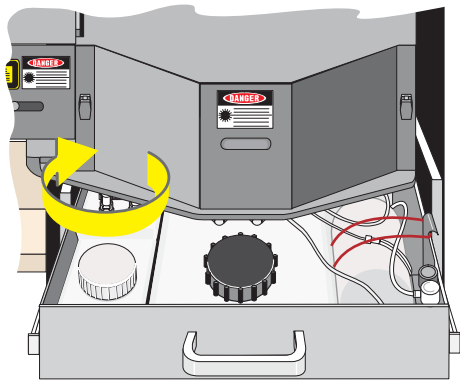
5 Position a funnel into the cleaning agent container.

6 Carefully pour cleaning agent into the cleaning agent container, filling it just to the bottom of its neck ❶.

7 Carefully wipe up any spills.

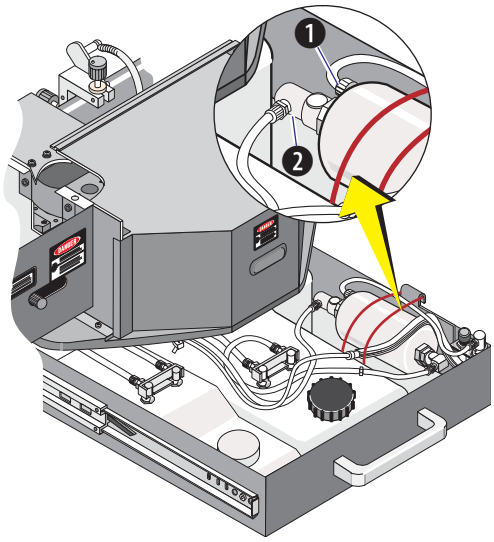


8 Screw the cap back on.

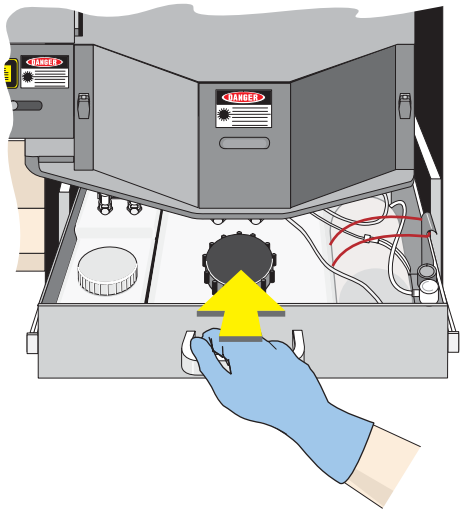


9 Check that:

- The sheath filter vent port ❶ is above the connector ❷.
- The tubing is not kinked or twisted.



10 Close the reagent drawer.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

11 Close the Front Cover.

SHOW ME.

12 Before running samples:

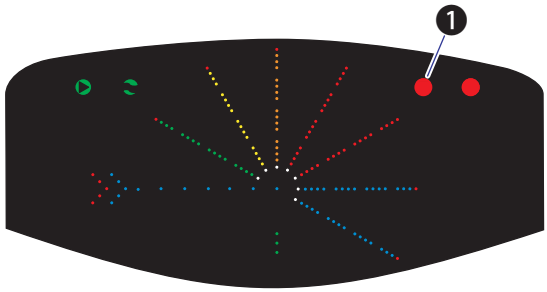
to initialize the system.

2.7 EMPTY THE WASTE CONTAINER

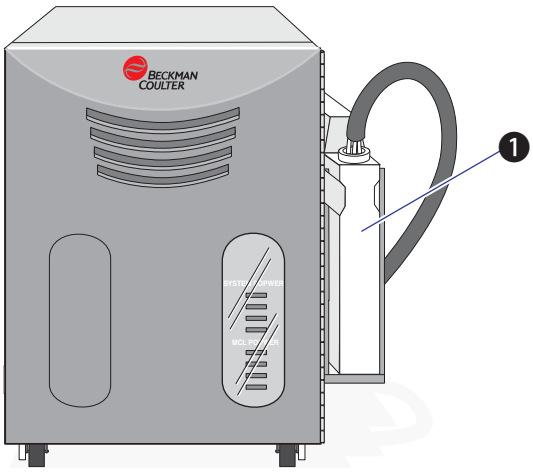
Instructions and graphics are given for both Power Supply configurations.

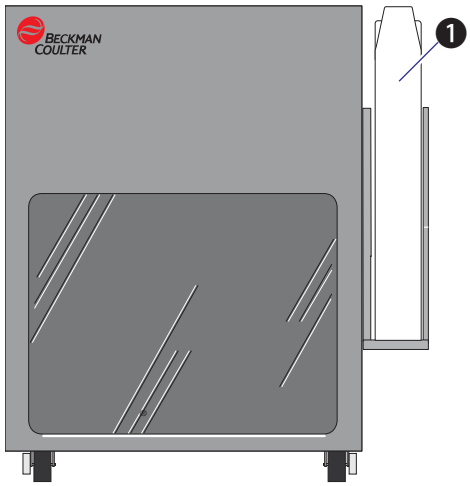
Empty the waste container when:

- The **Waste Full** indicator ❶ appears, or
- *Waste Level Warning* or *Waste Level Error* appears.



The 4-L waste ❶ container sits in a bracket on the right side of the Power Supply.





Procedure

---

1 Check if the instrument is currently displaying the Idle mode:

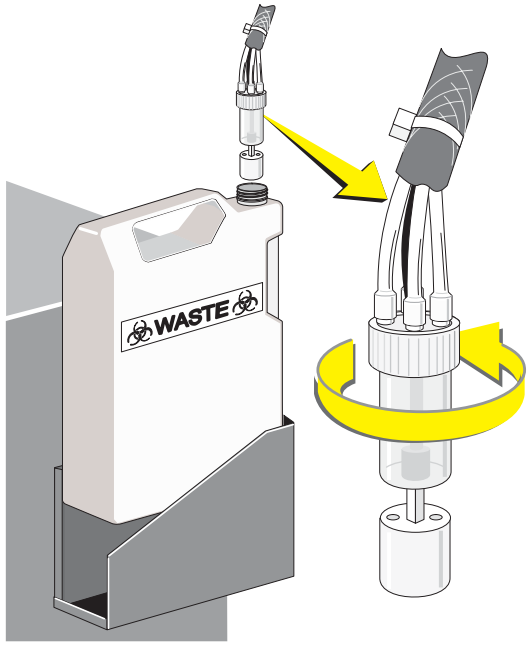
- If yes (*Press Idle Mode button to initialize* appears), go to step 2.
- If no, PUT THE CYTOMETER IN THE IDLE MODE.

Note: Wait until any instrument function is done before emptying the waste container.

2 Lift the waste container out of its bracket and swirl it before removing the cap.

WARNING Risk of biohazardous contamination if you have skin contact with the waste container, its contents, and its associated tubing. The waste container and its associated tubing might contain residual biological material and must be handled with care. Clean up spills immediately. Dispose of the contents of the waste container in accordance with your local regulations and acceptable laboratory procedures.

3 Unscrew the cap and lay it on a leakproof disposable container, such as a glove or beaker.



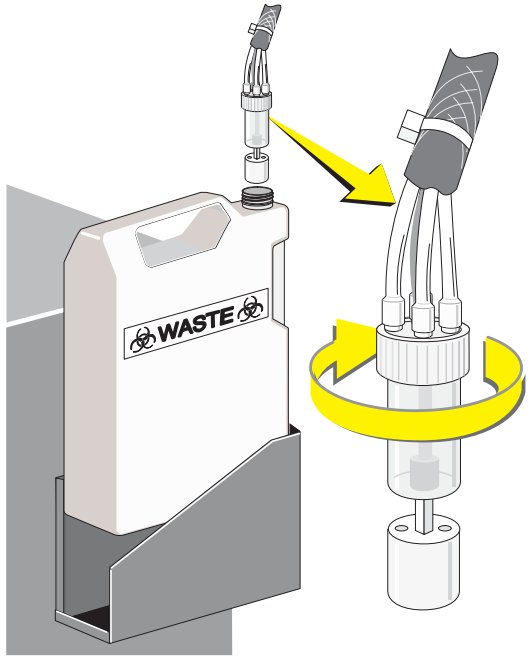
4 Empty the waste container according to your laboratory's procedures.

Note: Take proper precautions to avoid spills if you are emptying the waste container into a sink, drain, or larger container.

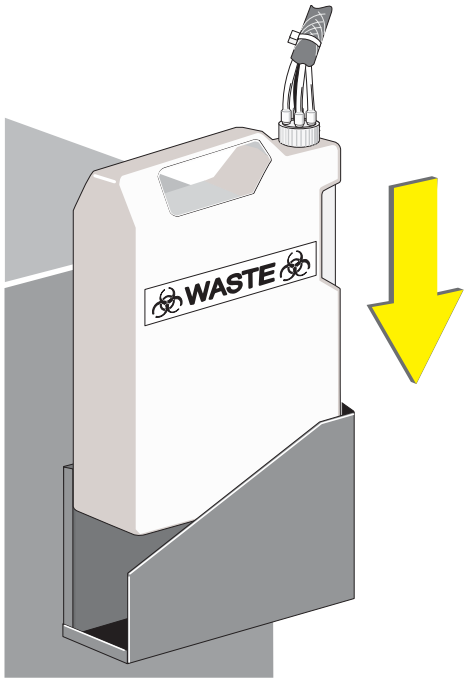
5 Put about 400 mL of high-quality, fragrance-free bleach ❶ (5% or 6% sodium hypochlorite - available chlorine) in the waste container to cover the bottom of the container.

6 Replace the cap and securely tighten.

Note: Properly dispose of the leakproof disposable container used in step 3 after you screw the cap back on the waste container.



7 Wipe the bracket with a paper towel moistened with a 10% bleach solution, and then return the container to the bracket.



8 The system automatically performs an initialization cycle if you emptied the waste container after the **Waste Full** indicator appeared.

Note: If you emptied the waste container before the **Waste Full** indicator appeared:

to initialize the system.

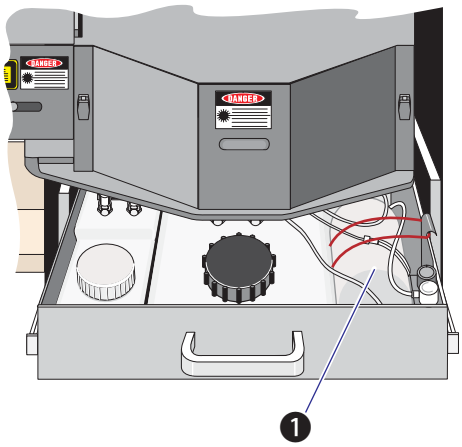
2.8 REPLACE THE SHEATH FLUID FILTER

Replace the 0.2-µm sheath fluid filter ❶:

- Every 6 months.

  or

- Whenever the sample flow rate is too high (repeated *Data Rate Warning* or *System Pressure Error* messages appear).



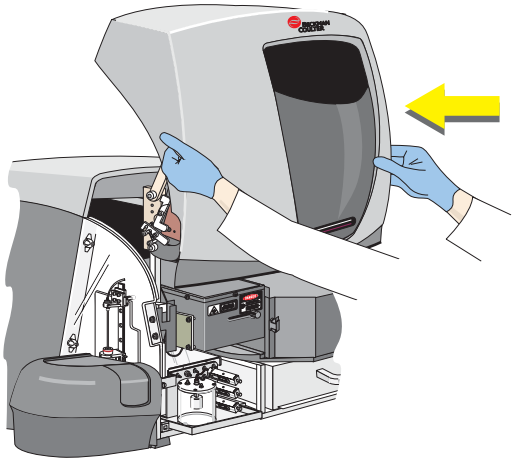
Procedure

1 Check if the instrument is currently displaying the Idle mode:

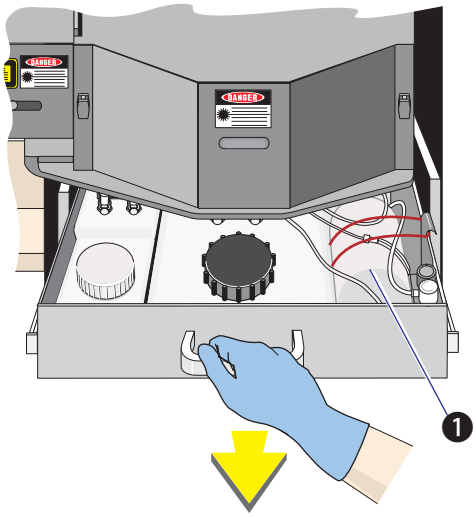
- If yes (*Press Idle Mode button to initialize* appears), go to step 3.
- If no, PUT THE CYTOMETER IN THE IDLE MODE.

2 Open the Front Cover.

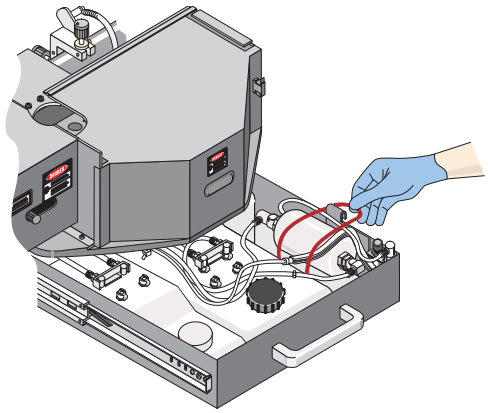
SHOW ME.



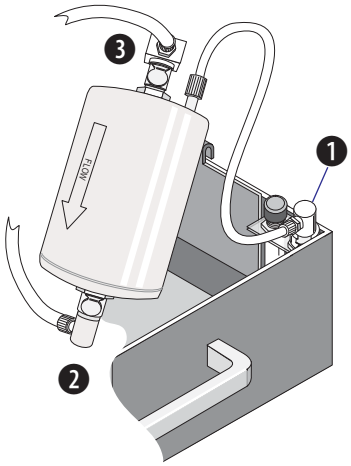
3 Open the reagent drawer. Locate the sheath filter ❶.



4 Undo the flexible strap holding the sheath fluid filter.



CAUTION Risk of damage to the instrument if you do not install the sheath fluid filter correctly. It allows fluid to flow in one direction only. Make sure you install the new sheath fluid filter correctly.



5 Pick up the old sheath fluid filter, and notice how the three tubes are connected ❶, ❷, ❸. Turn the filter and notice the direction of the arrow on it.

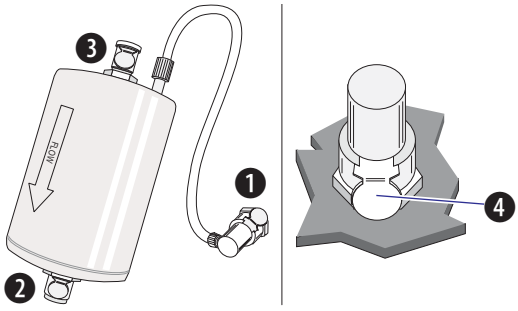
6 Get the new filter and hold it with the arrow going in the same direction as the arrow on the old filter.

Note: In the next step, immediately install the new filter to avoid spills.

7 Disconnect and reconnect each tube to the new filter, one at a time, in this order: ❶, ❷, ❸.

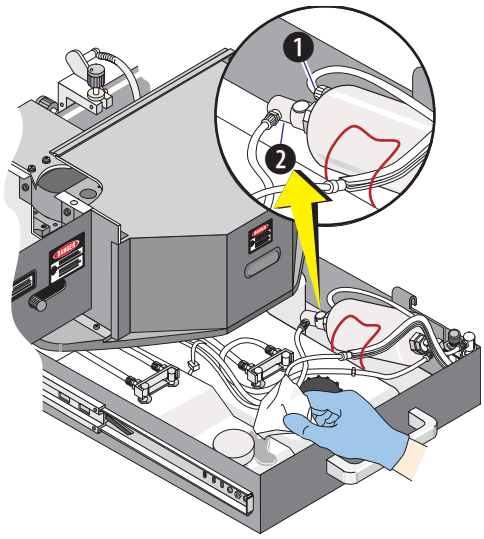
Each tube is disconnected by pushing in on the metal clip on the connector ❹.

When reconnected, the connectors snap into place.



8 Discard the old sheath fluid filter.

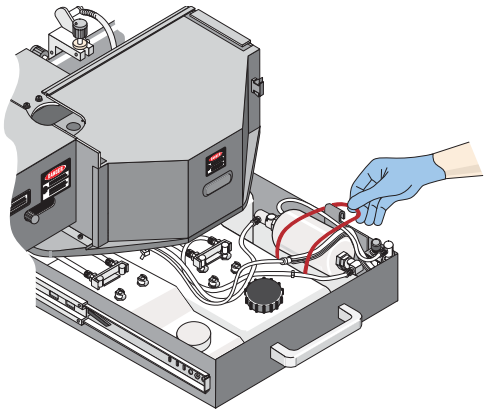
9 Wipe up any spills, and then put the filter in the drawer.



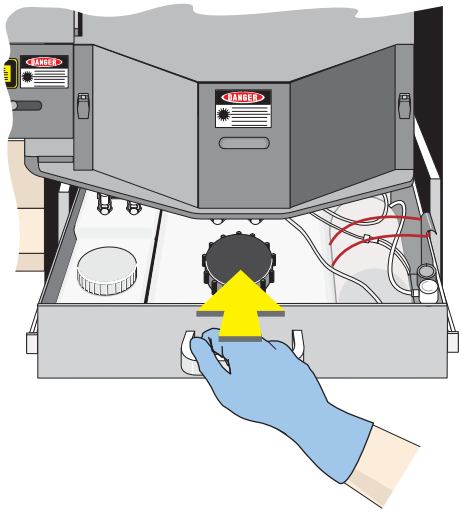
10 Check that:

- The vent port ❶ is above the connector ❷.
- The tubing is not kinked or twisted.

11 Reattach the flexible strap that holds the sheath fluid filter.



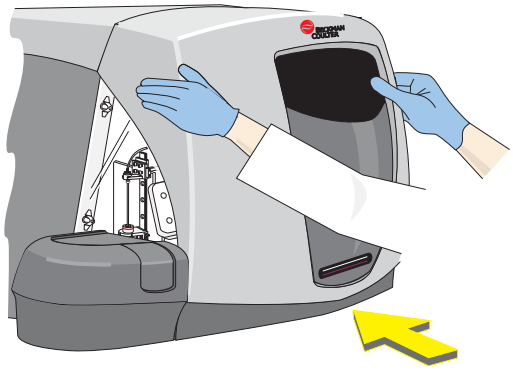
12 Close the reagent drawer and perform the VENT THE AIR BUBBLES procedure.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

13 Close the Front Cover.

SHOW ME.



14 Record that the sheath fluid filter was replaced on the electronic Maintenance Log.

2.9 REPLACE THE SAMPLE PROBE AND SAMPLE PICKUP TUBING

Replace the sample probe and sample pickup tubing when:

- The sample probe is bent. To see a video of this condition, click ***SHOW ME.***
- The sample probe leaks. To see a video of this condition, click ***SHOW ME.***
- There is erratic sample flow or no sample flow from the sample probe.

Click ***SHOW ME*** for an overview.

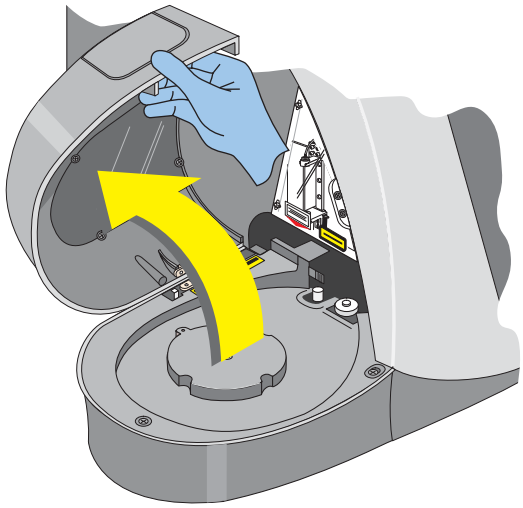
---

1 Power the Cytometer OFF.

---

2 Open the MCL cover.

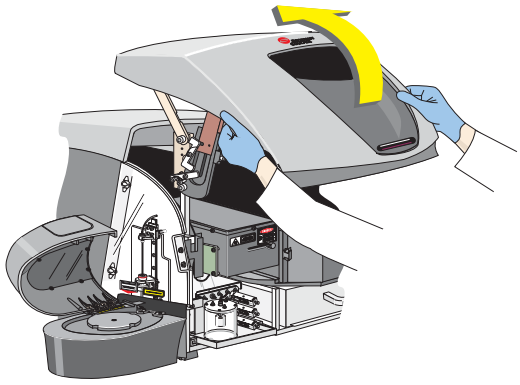
Note: If a carousel is present, remove it.



---

3 Open the Front Cover.

SHOW ME.

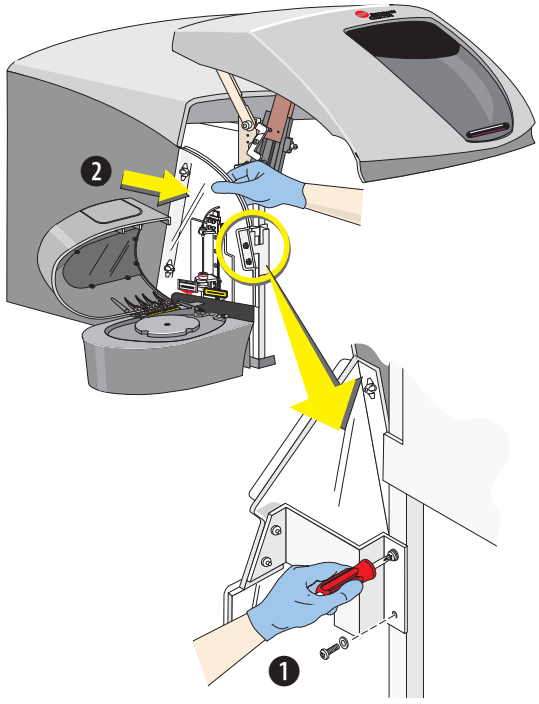


4 Remove the Front Left Side Panel:

❶ Unscrew the two screws that attach the left side panel to the front frame.

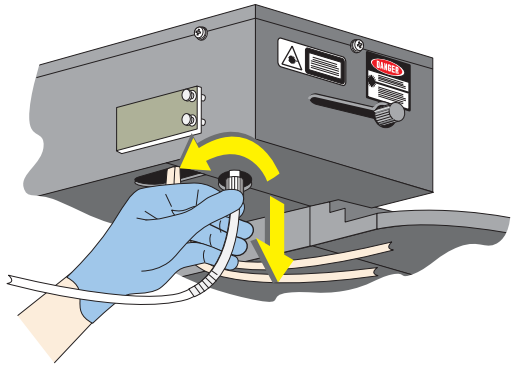
❷ Snap off the left side panel.

SHOW ME.

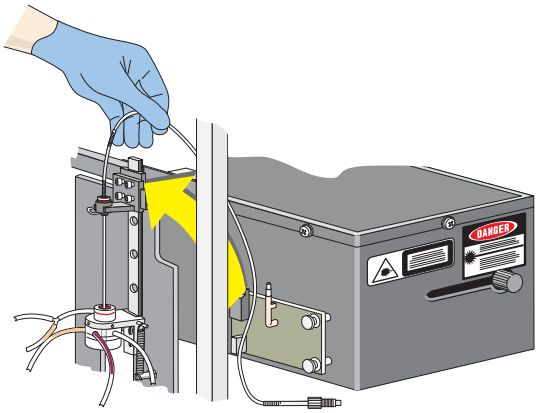


5 Unscrew the sample pickup tubing connector from the bottom of the flow cell compartment.

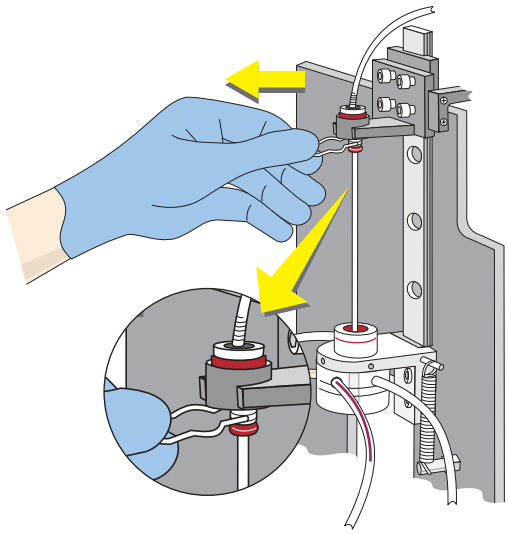
To view how to remove the sample probe and sample pickup tubing, click ***SHOW ME***.



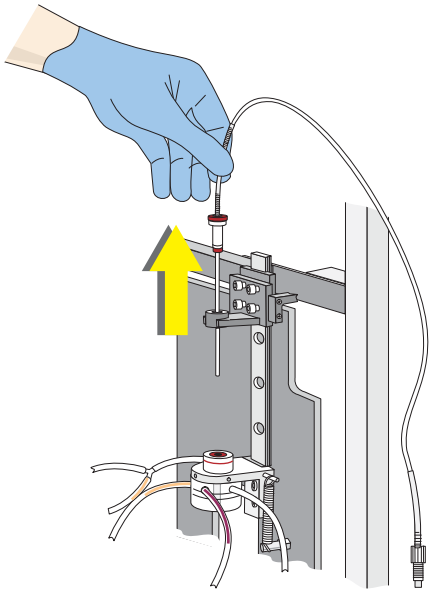
6 Pull the sample pickup tubing out through the left (MCL) side of the instrument.



7 Remove the clip from the sample probe. Retain the clip.



8 Lift the sample probe up and out of its holder.

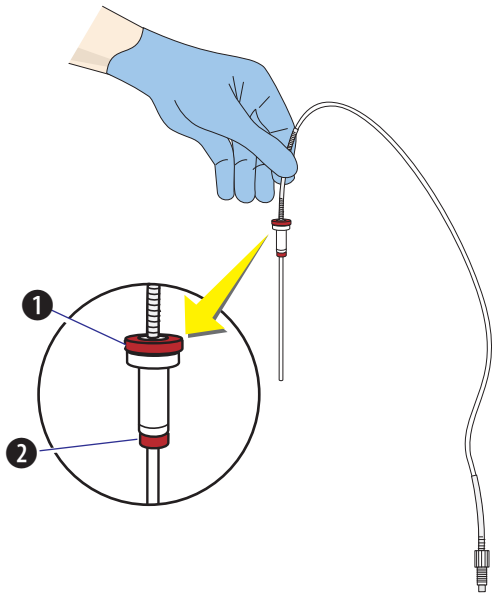


WARNING Risk of biohazardous contamination if you have skin contact with the sample pickup tubing. The sample pickup tubing might contain residual biological material and must be handled with care. Clean up spills immediately. Dispose of the sample pickup tubing in accordance with your local regulations and acceptable laboratory procedures.

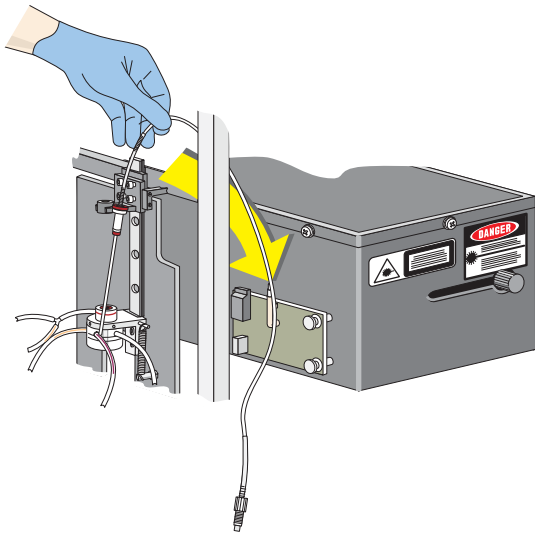
9 Discard the old sample pickup tubing and probe assembly in accordance with your local regulations and acceptable laboratory procedures.

10 Ensure that the rubber washer ❶ and O-ring ❷ are positioned correctly on the new sample probe.

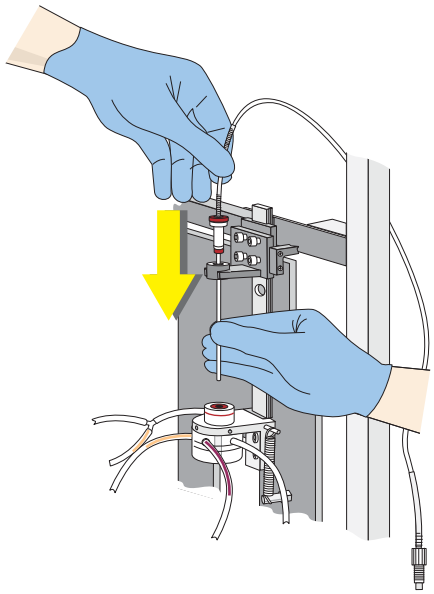
To view how to install the sample probe and sample pickup tubing, click ***SHOW ME***.



11 Thread the sample pickup tubing through the instrument.

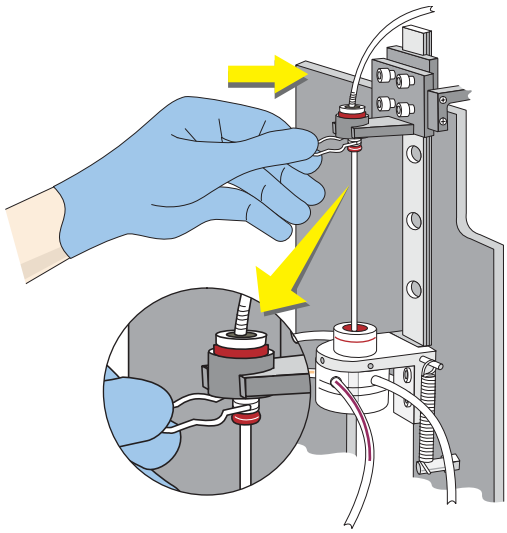


12 Insert the new sample probe into the sample probe holder.

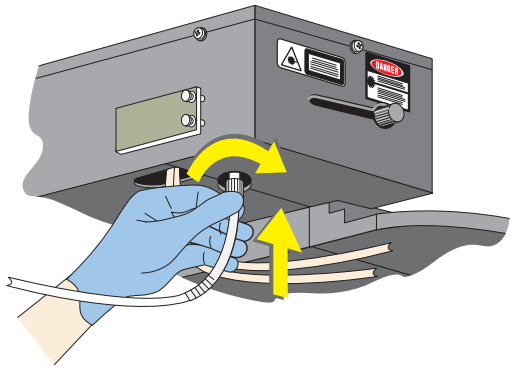


13 Guide the sample probe tip into the MCL sample head.

14 Insert the clip removed in step 7 into the groove on the sample probe.



IMPORTANT Risk of erroneous results if the flow cell is misaligned. Overtightening the connector from the sample pickup tubing to the flow cell can cause misalignment of the flow cell. Only screw on the sample pickup tubing connector "finger tight."



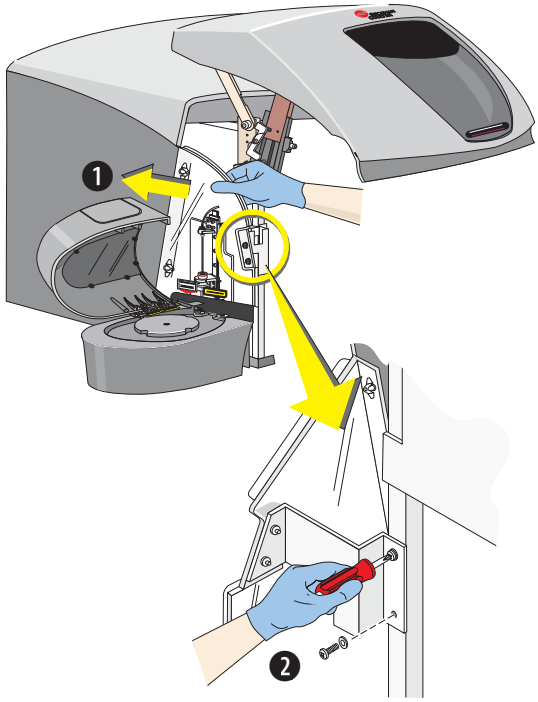
15 Screw on the connector from the sample pickup tubing to the bottom of the flow cell compartment until it is "finger tight."

16 Replace the Front Left Side Panel.

❶ Snap on the left side panel.

❷ Screw in the two screws to attach the left side panel to the front frame.

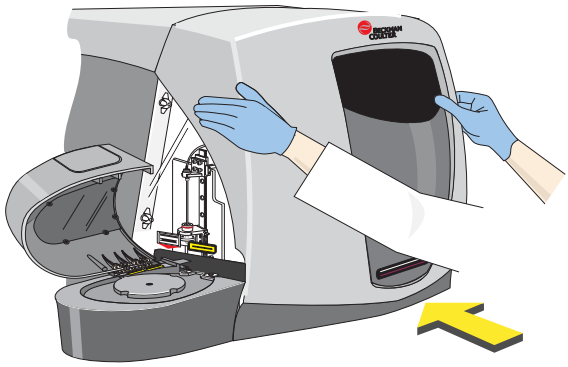
SHOW ME.



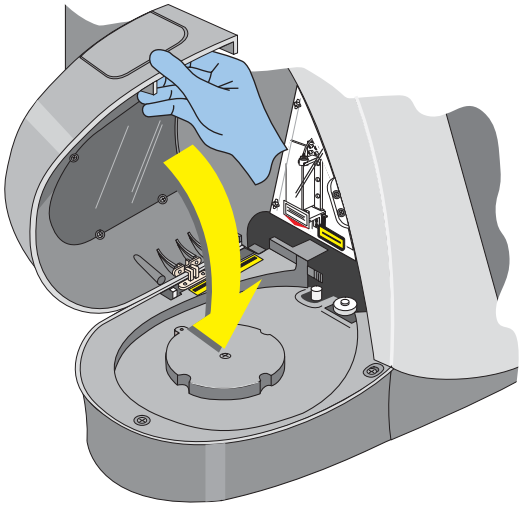
WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

17 Close the Front Cover.

SHOW ME.



18 Close the MCL cover.



19 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

20  .

21 After the prime cycle is done:

 again.

2.10 REPLACE THE MCL SAMPLE HEAD

Use this procedure when:

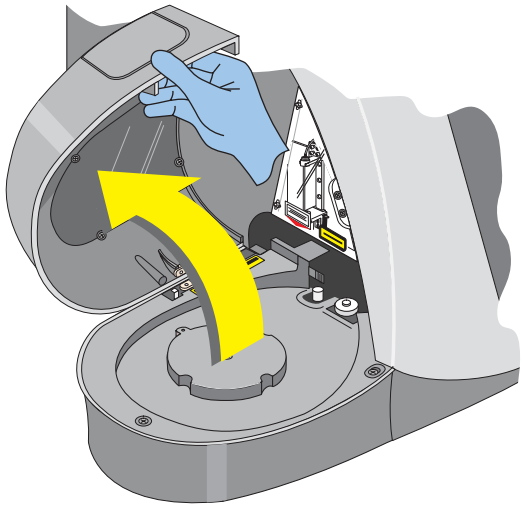
- Liquid from the cleaning adaptors does not draw up properly.
- Cleaning the sample head does not fix your excessive carryover problem.
- Numerous *Sample Pressure Error* or *MCL Tube Up/Down Error* messages occur.

To see a video presentation of the main steps of this procedure, click ***SHOW ME***.

1 Power the Cytometer OFF.

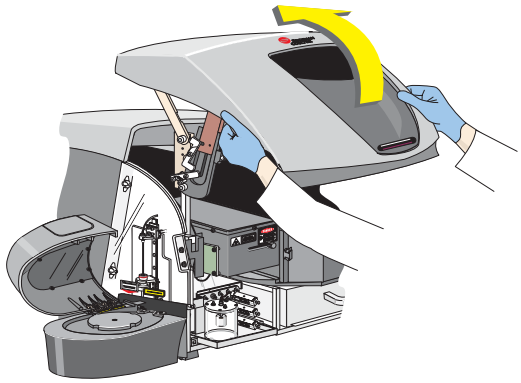
2 Open the MCL cover.

Note: If a carousel is present, remove it.



3 Open the Front Cover.

SHOW ME.

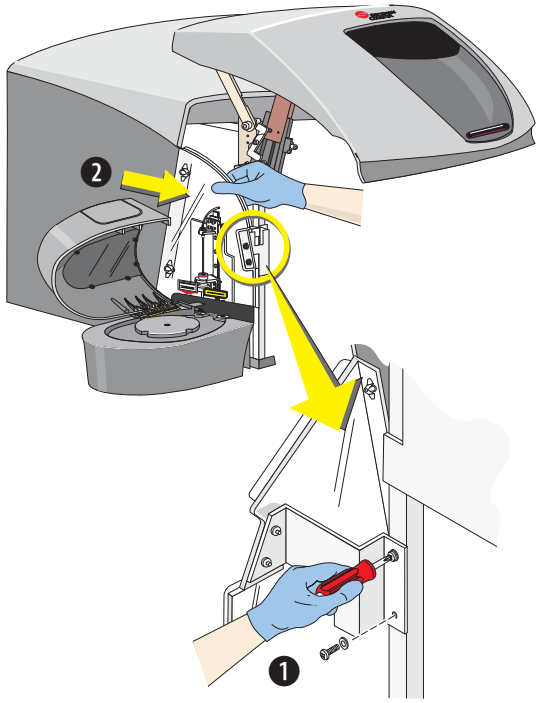


4 Remove the Front Left Side Panel:

❶ Unscrew the two bolts that attach the left side panel to the front frame.

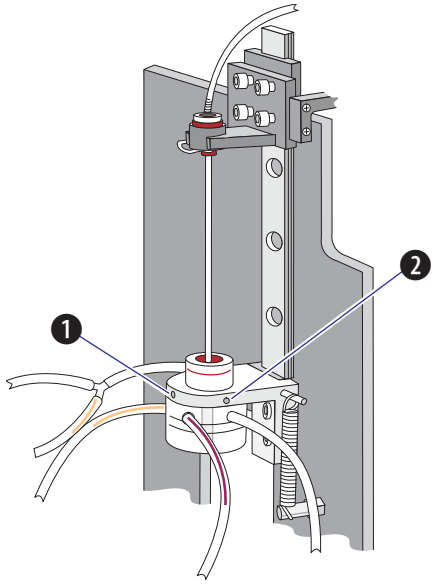
❷ Snap off the left side panel.

SHOW ME.

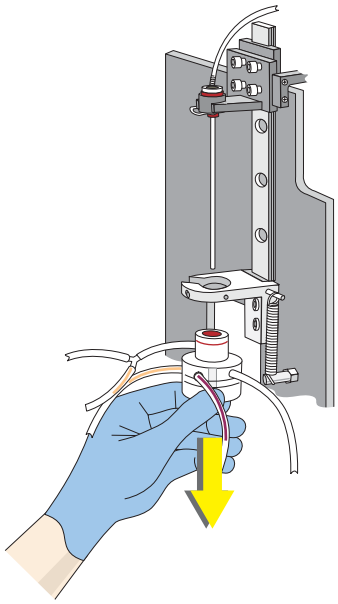


5 Use a 0.050 in. Allen wrench to loosen the side ❶ and front ❷ setscrews on the sample head.

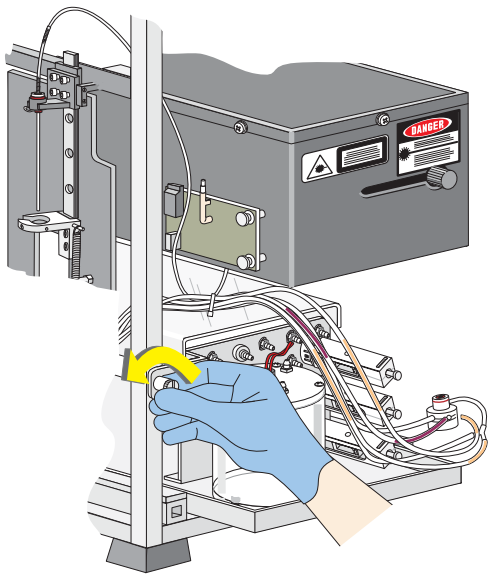
SHOW ME.



6 Pull off the sample head.

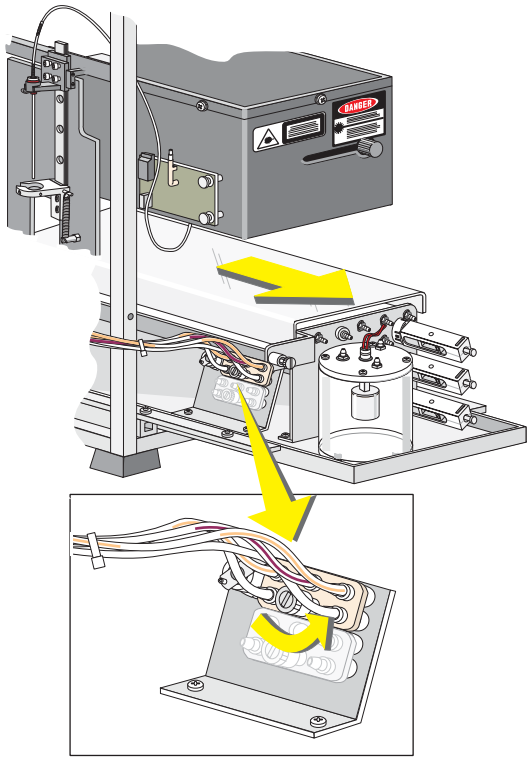


7 Pull the sample head and tubing through the instrument behind the frame.



8 Loosen the thumbscrew at the side of the pneumatic drawer.

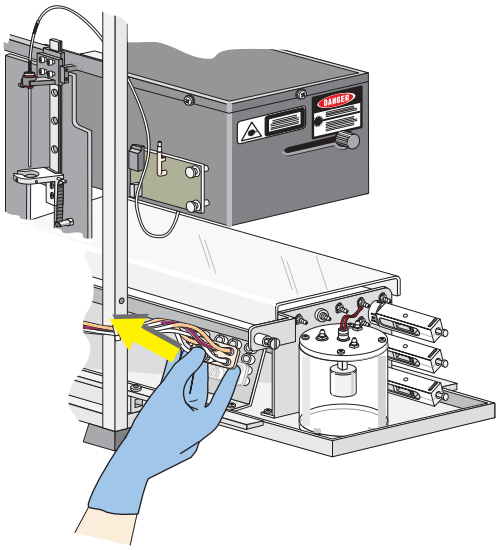
9 Pull out the pneumatic drawer so you can access the tubing manifold.



10 Loosen the thumbscrew holding the upper tubing manifold.

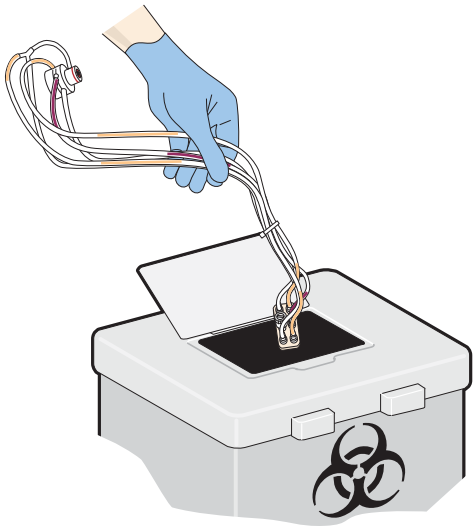
Note: You might find it easier to unscrew the thumbscrew with a screwdriver.

11 Pull off the tubing manifold.



WARNING Risk of biohazardous contamination if you have skin contact with the sample head and its tubing. The sample head tubing might contain residual biological material and must be handled with care. Clean up spills immediately. Dispose of the sample head and tubing in accordance with your local regulations and acceptable laboratory procedures.

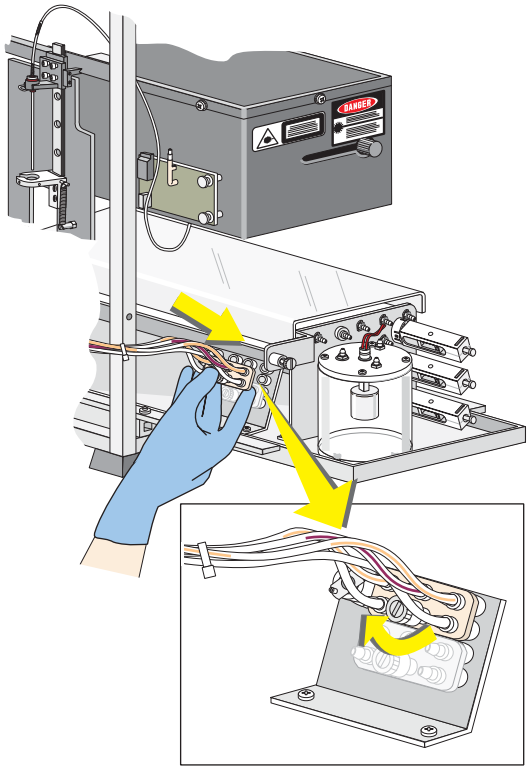
12 Discard the old sample head and tubing assembly in accordance with your local regulations and acceptable laboratory procedures.



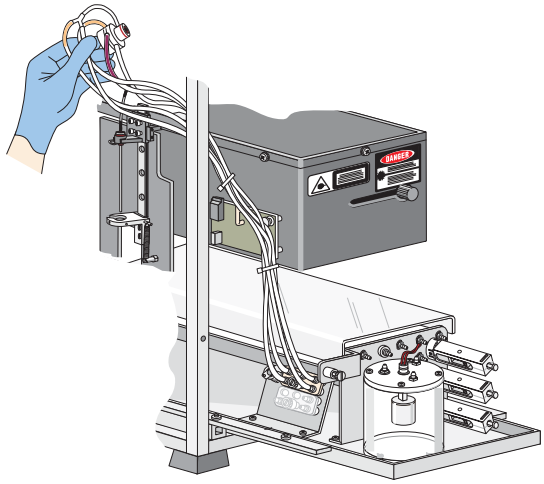
13 Place the new tubing manifold into the bracket in the pneumatic drawer and tighten the thumbscrew.

Note: You might find it easier to screw in the thumbscrew with a screwdriver.

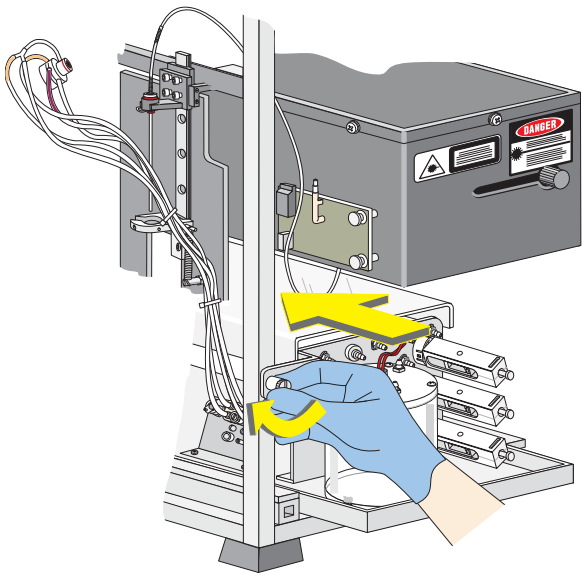
To view how to install the MCL sample head, click ***SHOW ME***.



14 Route the sample head through the instrument.



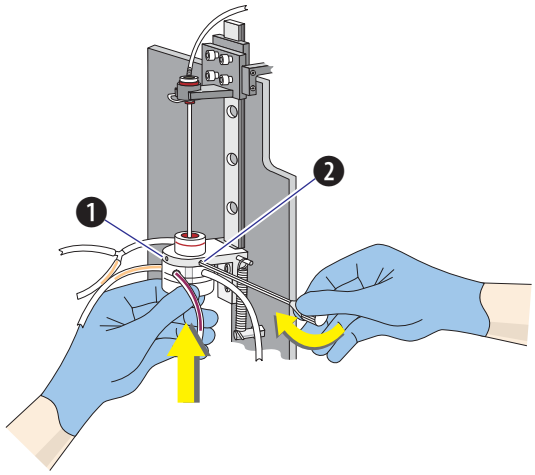
15 Slide the pneumatic drawer in and tighten the thumbscrew.



16 Position and hold the sample head up against its bracket.

17 Tighten the side ❶ setscrew first.

Then tighten the front ❷ setscrew.

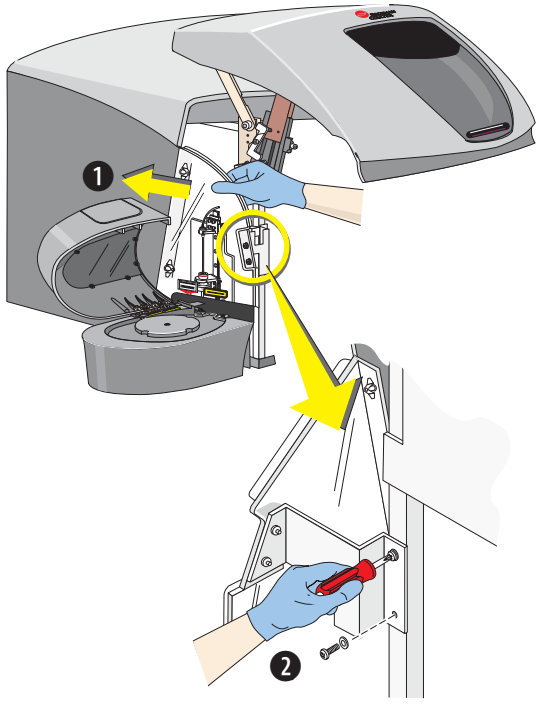


18 Replace the Front Left Side Panel:

❶ Snap on the left side panel.

❷ Screw in the two bolts to attach the left side panel to the front frame.

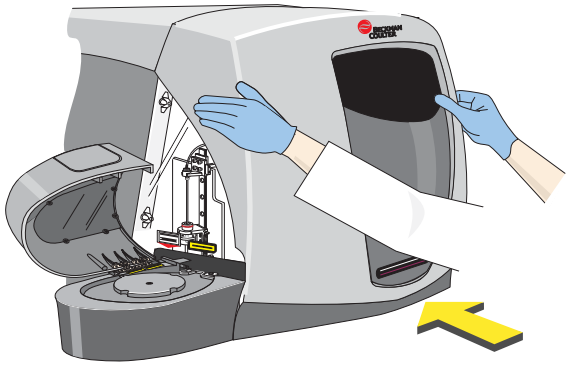
SHOW ME.



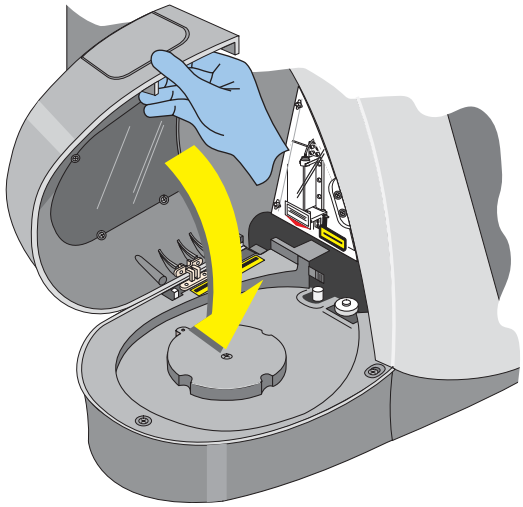
WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

19 Close the Front Cover.

SHOW ME.



20 Close the MCL cover.



21 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

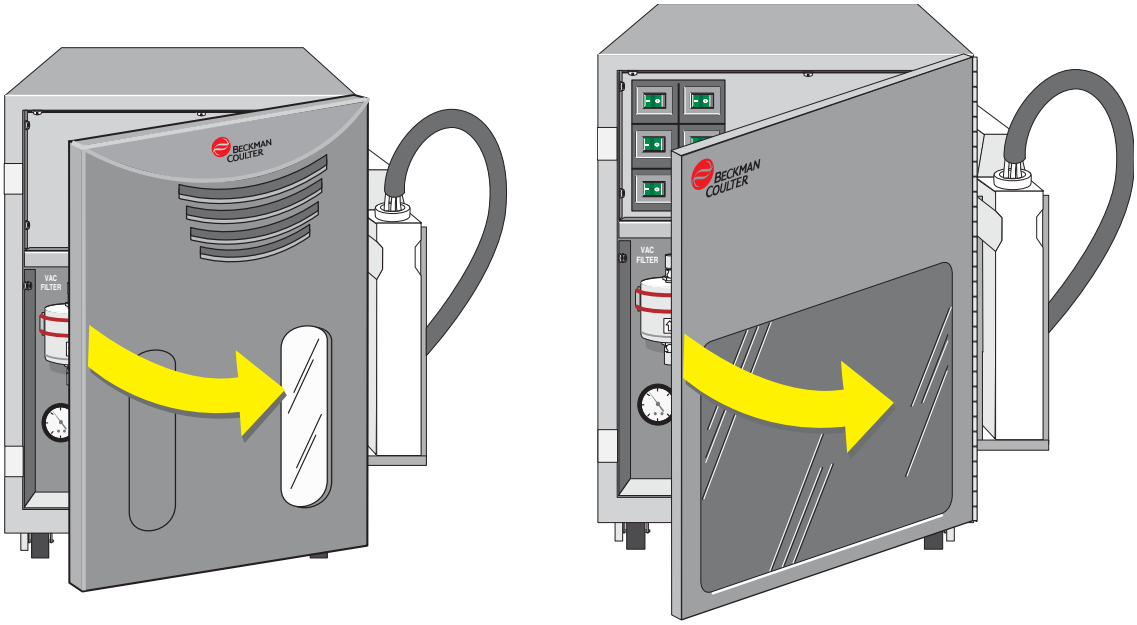
2.11 ADJUST THE SYSTEM PRESSURE

- Adjust the system pressure if the System Pressure gauge is not reading 30 ±2 psi.
- Daily Startup describes how to check the System Pressure gauge reading on the Power Supply.

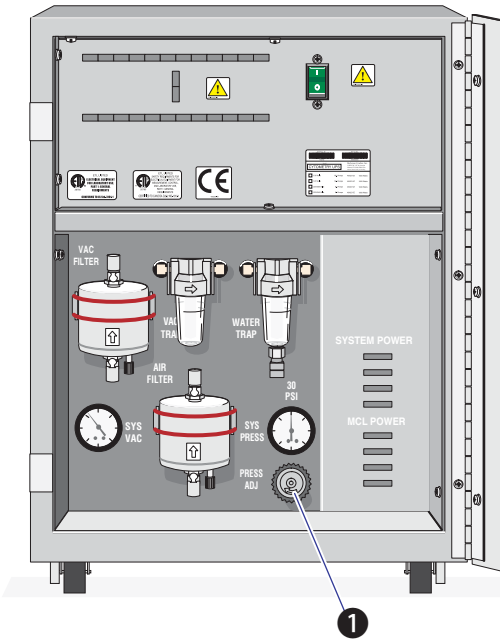
Instructions and graphics are given for both Power Supply configurations.

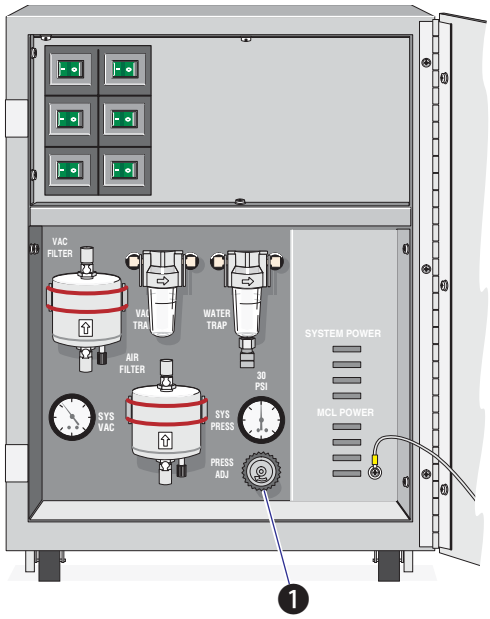
---

1 Open the Power Supply front door.

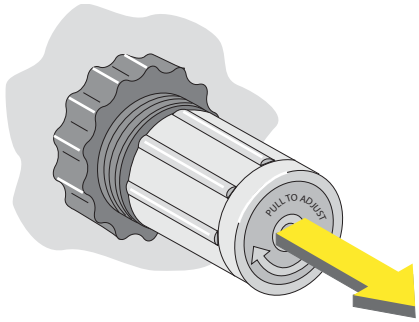


2 Locate the Pressure Adjust knob ❶.





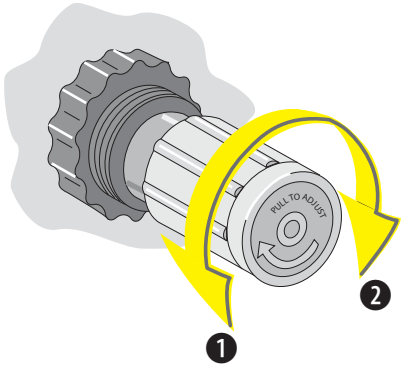
3 Pull the collar around the Pressure Adjust knob out toward you.



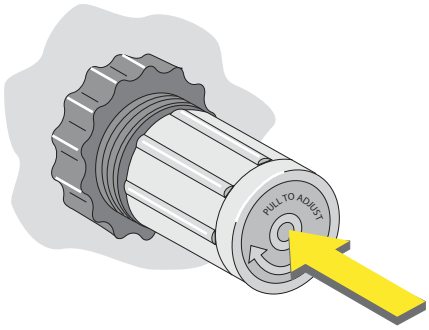
4 Adjust the pressure to 30 ±2 psi.

❶ To decrease, turn to the left.

❷ To increase, turn to the right.



5 Push in on the collar to lock it into place.



2.12 REPLACE THE OPTICAL FILTER PLATE

Replace the optical filter plate when you need to use a different filter configuration for a different application.

Remove the Optical Filter Plate

Click ***SHOW ME*** for an overview.

IMPORTANT Risk of incorrect readings from a contaminated filter if you wear gloves with powder to perform this procedure. Powder from the gloves can contaminate the filter and cause incorrect readings. Wear powder-free gloves whenever you are working with any optical filter components.

1 Wear powder-free gloves to perform this procedure.

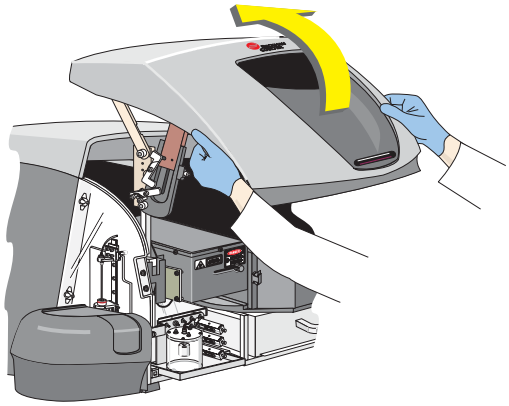
---

2 Power the Cytometer OFF.

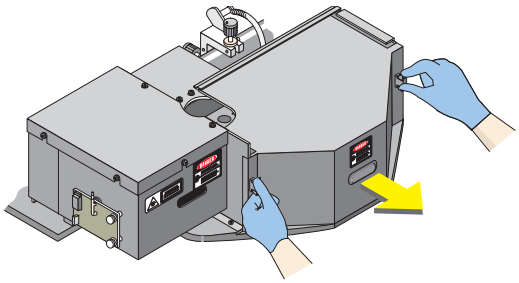
---

3 Open the Front Cover.

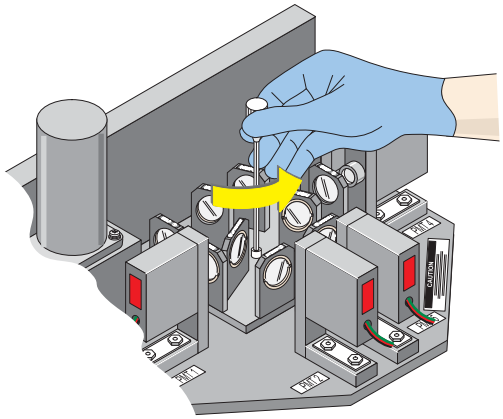
SHOW ME.



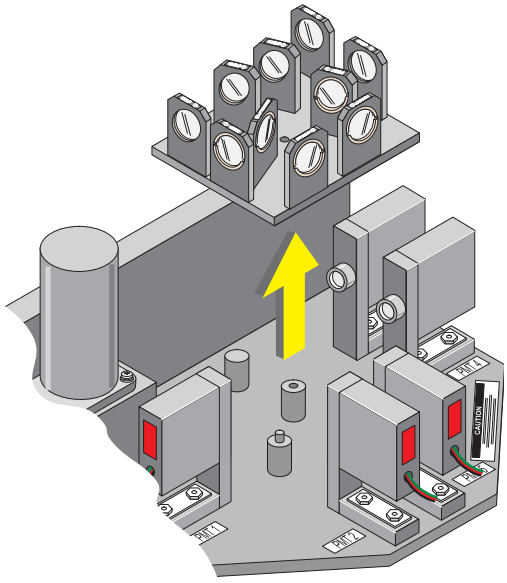
4 Pinch down on both release clips of the optical area cover. Slide the cover forward and lift it off.



5 Use a 3/16 in. Allen wrench to unscrew the bolt in the middle of the optical filter plate.



6 Lift the optical filter plate up and off.
Set this optical filter plate aside.



Install the Optical Filter Plate

Click ***SHOW ME*** for an overview.

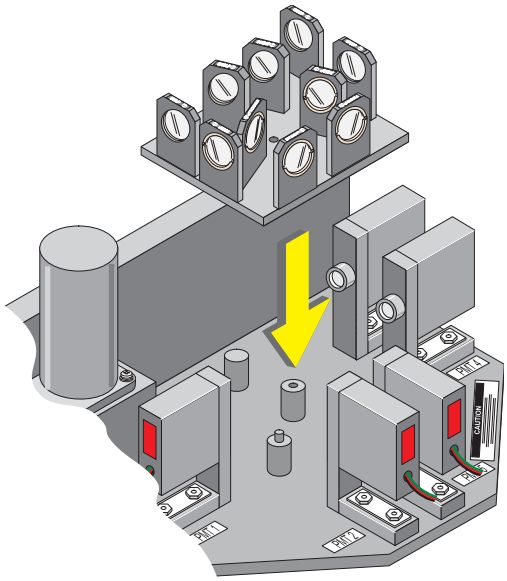
IMPORTANT Risk of incorrect readings from a contaminated filter if you wear gloves with powder to perform this procedure. Powder from the gloves can contaminate the filter and cause incorrect readings. Wear powder-free gloves whenever you are working with any optical filter components.

1 Wear powder-free gloves to perform this procedure.

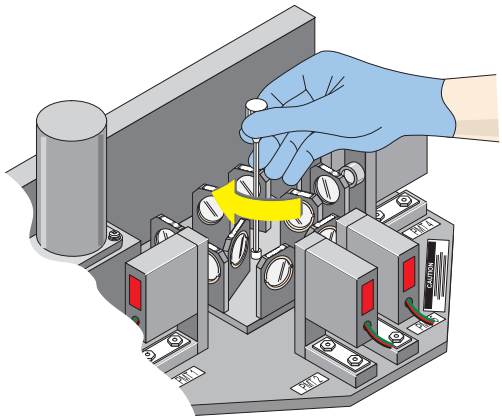
---

2 Place the new optical filter plate into the instrument.

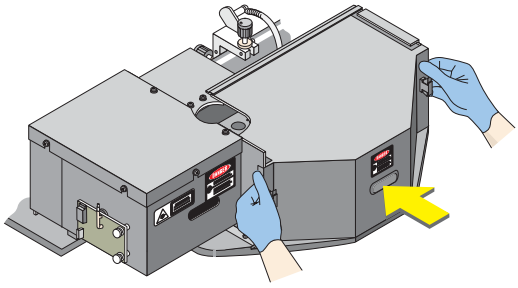
Check that it is firmly seated.



3 Use a 3/16 in. Allen wrench to screw in the bolt in the middle of the optical filter plate.



IMPORTANT Risk of incorrect results. If the optical area cover is not replaced securely, there will be no fluorescence signals but there will be FS and SS signals. Be sure the optical area cover snaps into position.



4 Slide the optical area cover back into position until it snaps into place.

WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

5 Close the Front Cover.

SHOW ME.

6 Power the Cytometer Only ON or Power the Cytometer and CXP Software ON.

2.13 REPLACE A FILTER IN THE OPTICAL FILTER PLATE

Perform this procedure when:

- When there is a loss of signal power - replace the old filter with a new filter of the same type.
- When you are running a different application and need a different filter in that filter holder.

IMPORTANT Risk of incorrect readings from a contaminated filter if you wear gloves with powder to perform this procedure. Powder from the gloves can contaminate the filter and cause incorrect readings. Wear powder-free gloves whenever you are working with any optical filter components.

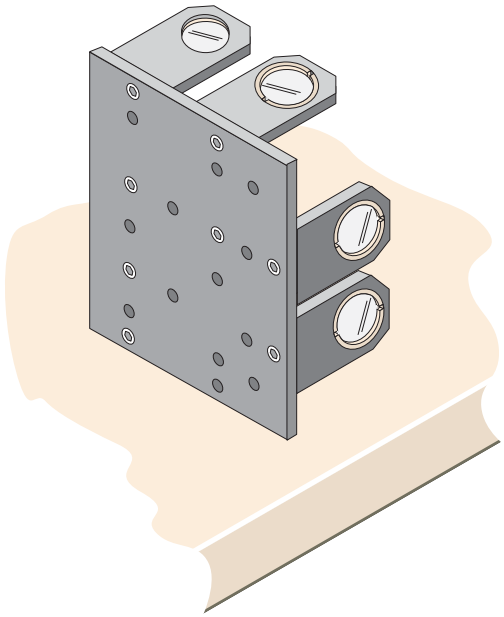
1 Wear powder-free gloves to perform this procedure.

2 Remove the Optical Filter Plate.

To see a video presentation of the main steps of how to remove the optical filter plate, click ***SHOW ME***.

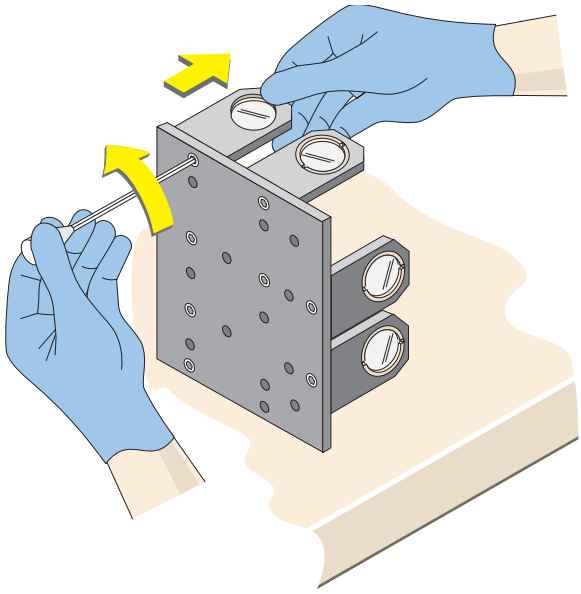
3 Turn the optical filter plate on its side.

To see a video presentation of the main steps of how to remove a filter, click ***SHOW ME***.



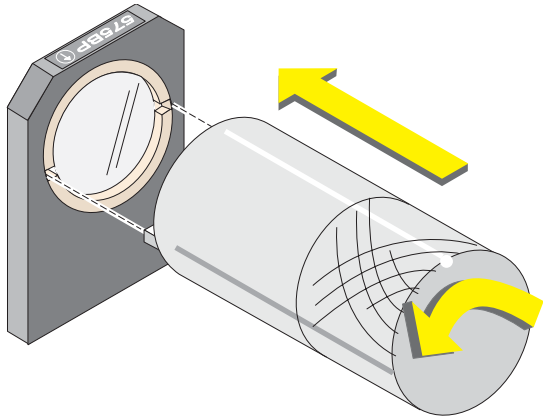
4 On the underside of the optical filter plate, locate the screw that holds the filter holder to be removed.

5 Use a 9/64 in. Allen wrench to remove the screw that holds the filter to be replaced from the optical filter plate.



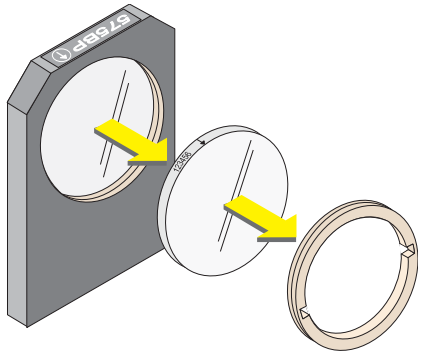
6 Use the special tool provided to loosen the metal ring on the filter holder.

Note: You might find it easier to finish loosening the metal ring by turning it with your gloved fingers.



7 Insert the tool into the metal ring's two slots and turn to the left.

8 Remove the metal ring and the filter.



9 Orient the new filter correctly and insert the filter into the filter holder.

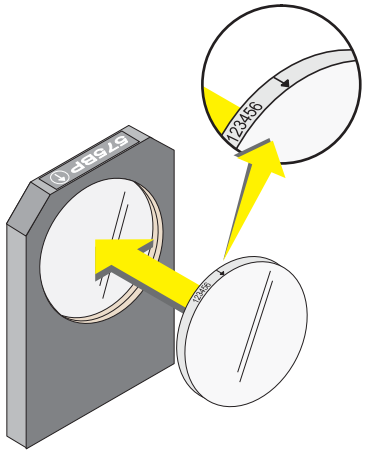
- For BCI filters:

  Position the filter into the filter holder so the arrow points to the metal ring.

- For non-BCI filters:

  See step 10 for how to determine correct orientation.

To see a video presentation of the main steps of how to install a filter, click ***SHOW ME***.



10 Determine which is the coated side ❶ of a non-BCI filter:

a. Take the eraser end of a pencil and hold it close to the filter, near its edge.

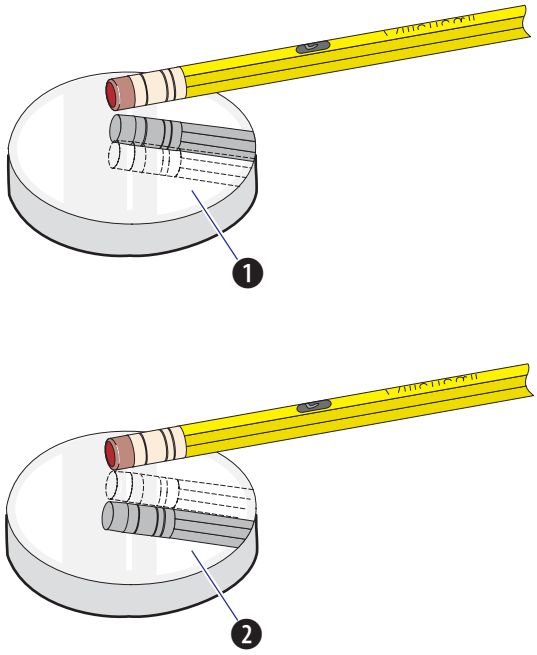
b. Look at the two reflections, dark- and light-colored, of the pencil.

c. Turn the filter over and repeat steps a and b.

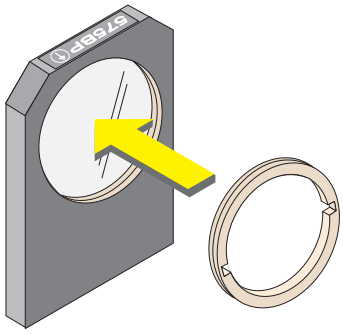
d. The side where the pencil touches the dark-colored reflection is the coated side ❶.

The uncoated side ❷ shows the pencil touching the light-colored reflection.

e. The coated side ❶ should face the metal ring when you insert it.

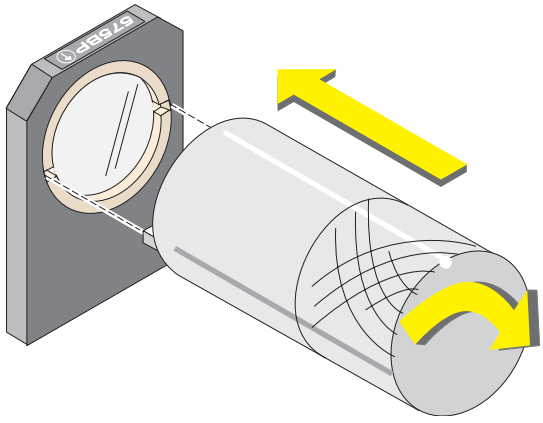


11 Place the metal ring over the filter in the filter holder.



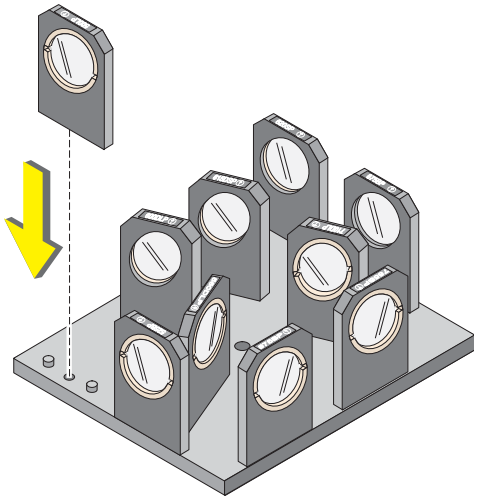
12 Insert the special tool into the metal ring's two slots and turn to the right to tighten.

Note: You might find it easier to begin tightening the metal ring by turning it with your gloved fingers.

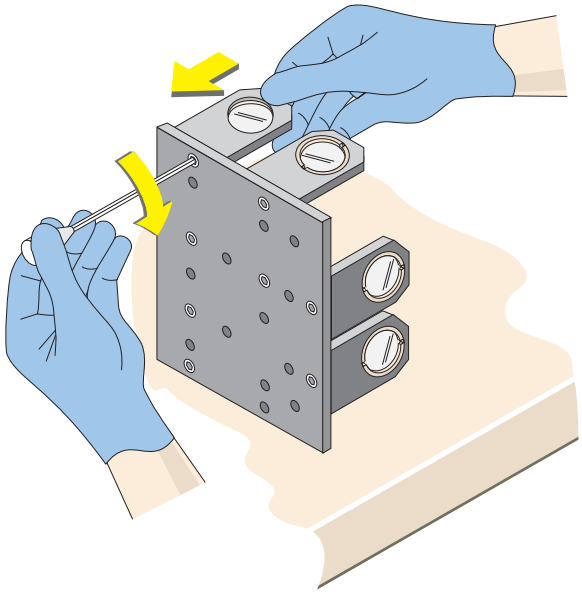


13 Orient the filter holder and filter correctly:

- If there are arrows on the optical plate, place the side of the filter holder with the metal ring in the same direction as the arrow.
- If there are no arrows on the optical plate, place the filter holder so the metal ring faces in the direction where the light should go.



14 Insert the filter holder into the optical filter plate and screw in the holding screw.



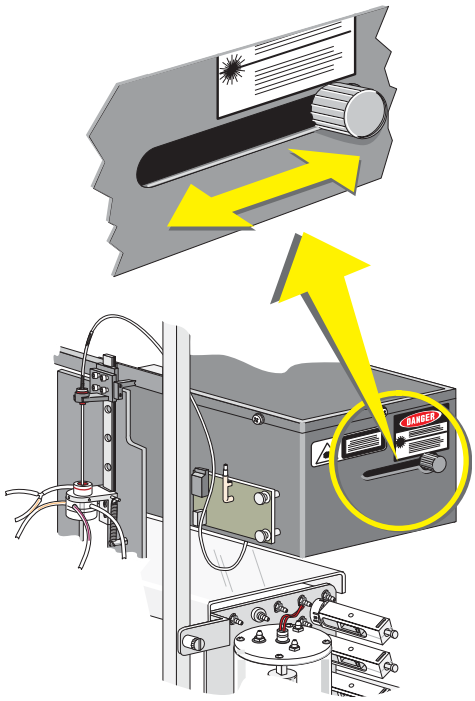
15 Install the Optical Filter Plate into the instrument.

To see a video presentation of the main steps of how to install the optical filter plate, click ***SHOW ME***.

Note: If you replaced a damaged filter with the same type of filter, check that you retrieve similar autostandardization mean intensity values with the new filter.

2.14 POSITION THE FIELD STOP

- You can change the angle of forward scatter (FS) light collection from 1-19° to 1-8° by putting the Field Stop into position.
- Put the Field Stop into position (1-8°) for better separation of cell populations in samples with a lot of debris.
- Position the Field Stop by sliding a spring-loaded knob along a track.
  - When the knob is at the left end of its track, the Field Stop is used. The angle of light collection is reduced to 1-8°.
  - When the knob is at the right end of its track, the Field Stop is not used. The angle of light collection is from 1-19°.



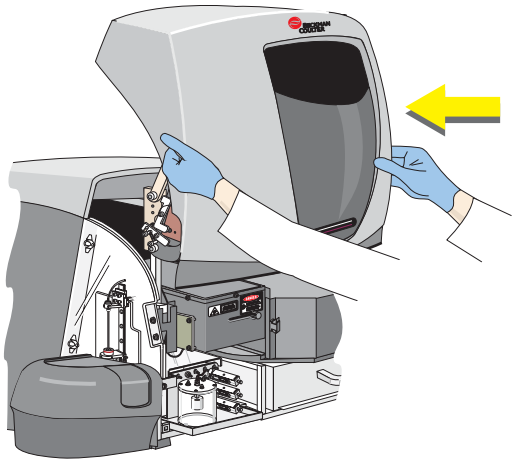
Procedure

Perform this procedure when you need to change the field stop postion to use a different angle of forward scatter.

---

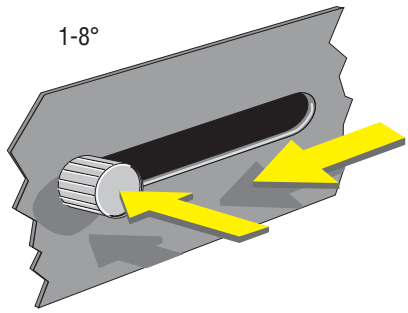
1 Open the Front Cover.

SHOW ME.



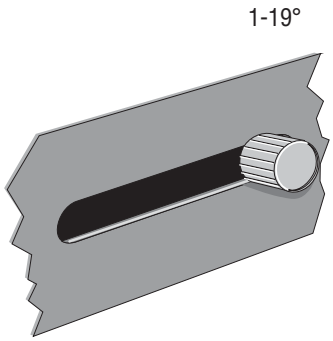
2 To put the Field Stop into position and use the 1-8° angle of FS light collection:

- Slide the knob all the way to the left end of its track.
- Push it in to lock it into position.



3 To move the Field Stop so it is not in use (1-19° angle of FS light collection):

- Pull out on the knob to unlock it.
- Guide the knob to the right end of its track.



WARNING Risk of operator injury. To prevent injury, hold your hands flat on the sides of the cover. Ensure your fingers are not behind the cover as you push down and in to close it.

4 Close the Front Cover.

SHOW ME.

2.15 RESET THE CIRCUIT BREAKERS

Perform this procedure when:

- The unit does not go to **Ready** when you turn the power ON.
- There is no compressor sound from the Power Supply when there normally should be.

Instructions and graphics are given for both Power Supply configurations. Use the procedure (Procedure 1 or Procedure 2) that corresponds to your Power Supply configuration.

If you have the Universal Power Supply configuration:

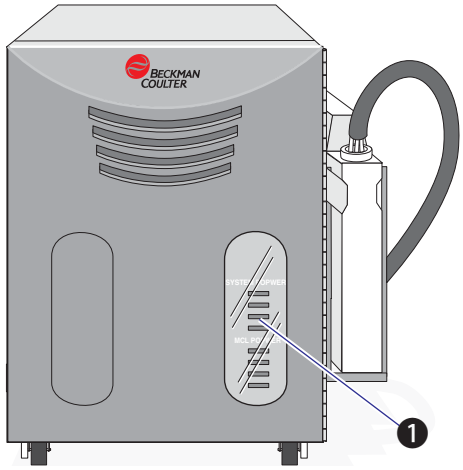
Follow Procedure 1 to reset the power.

If you have the Voltage-specific Power Supply configuration:

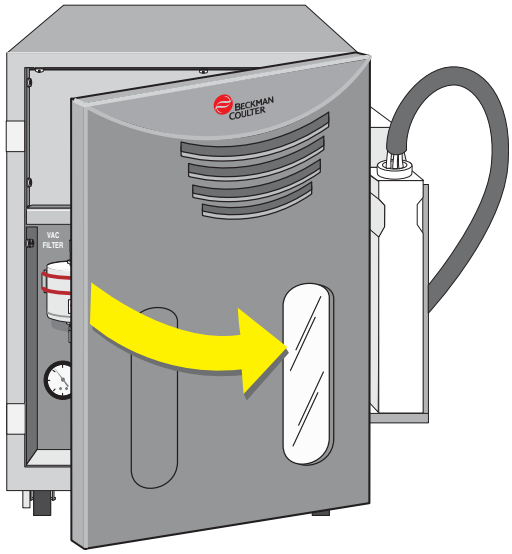
Follow Procedure 2 to reset the circuit breaker(s).

Procedure 1

1 Check the indicators ❶ through the front door of the Power Supply.

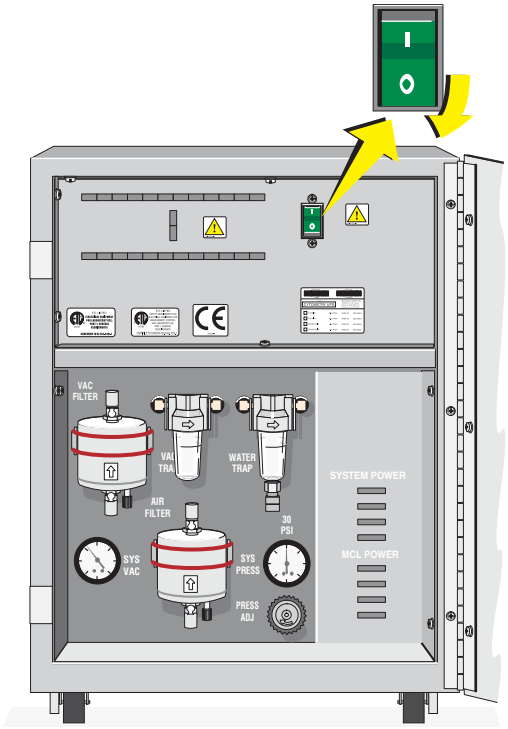


2 Open the Power Supply front door.

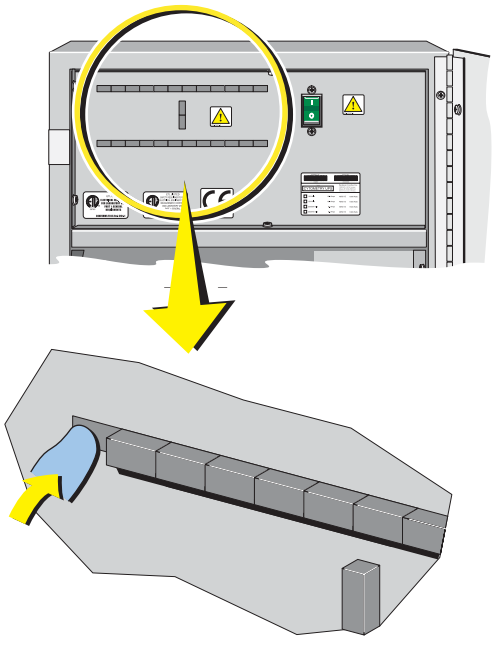


3 If the indicators are off (dark), reset the circuit breakers.

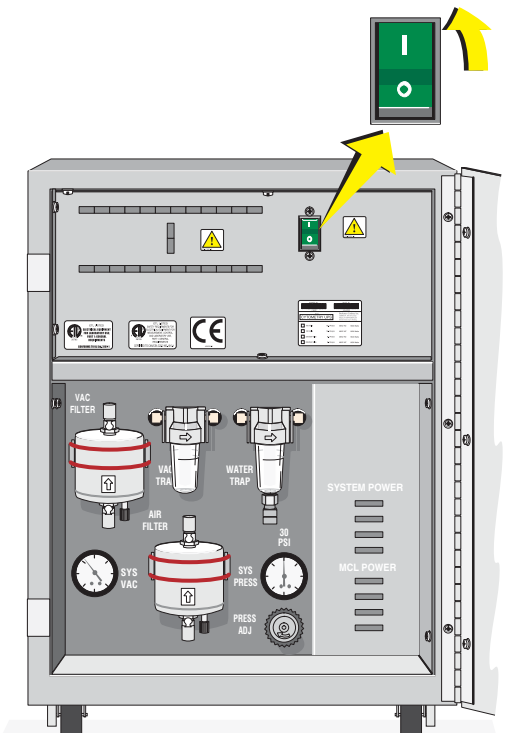
Put the main switch in the **0** position to turn the power supply off.



4 Reset the circuit breakers by pressing all 26 buttons



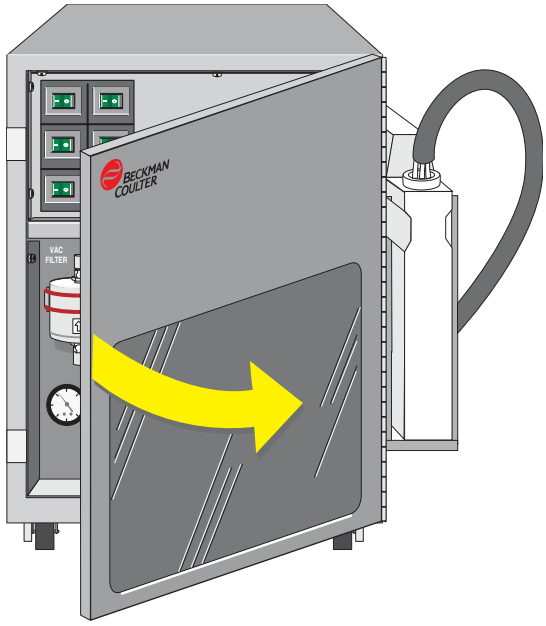
5 Put the main switch in the 1 position to turn the power supply back on.



6 Power the Cytometer OFF and then Power the Cytometer and CXP Software ON.

Procedure 2

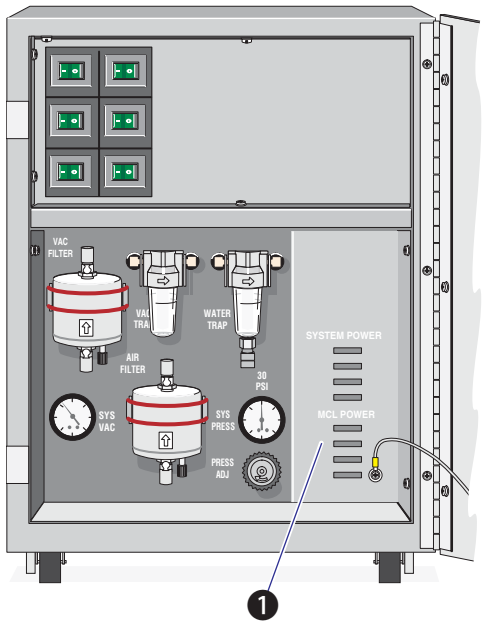
1 Open the Power Supply front door.



2 Check the indicators ❶ on the front of the Power Supply.

a. If any indicator is off (dark), proceed to step 3 to reset the appropriate circuit breaker.

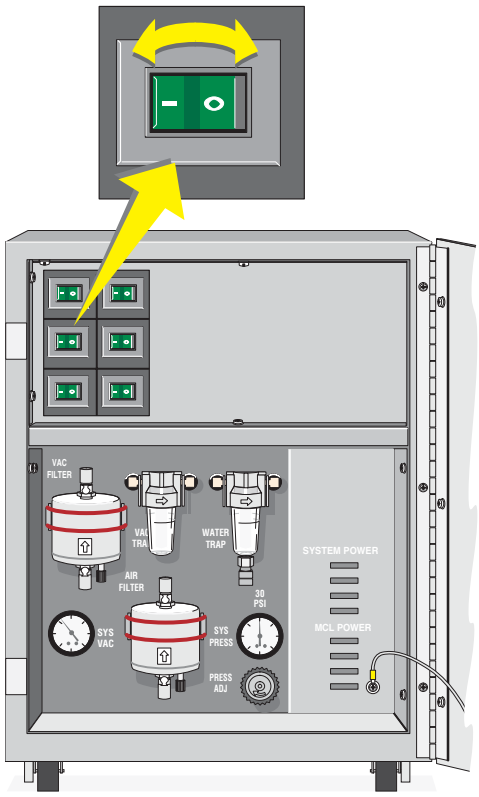
b. If no indicator is dark, check if the power switch at the back of the Power Supply is OFF (0). If it is, turn it ON (1) and proceed to step 5.



3 Find the circuit breaker that corresponds to the dark indicator:

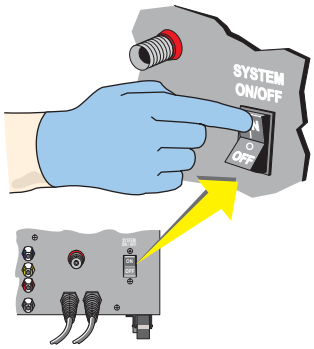
System Power Indicator	Circuit Breaker	MCL Power Indicator	Circuit Breaker
+5V	5 VOLTS	+5V	MCL 5 VOLTS
+15V	15 VOLTS	+12V	MCL 5 VOLTS
-15V	15 VOLTS	-12V	MCL 5 VOLTS
+24V	24 VOLTS	+24V	MCL 24 VOLTS

4 Put the circuit breaker in the **0** position, and then return it to the **1** position.



5 Power the Cytometer OFF and then Power the Cytometer and CXP Software ON.

6 On the back of the Power Supply, turn OFF (0) the system and then turn it back ON (1) to finish resetting the instrument.



2.16 ADJUST THE HENE LASER

Use this procedure to make minor adjustments only to the HeNe laser.

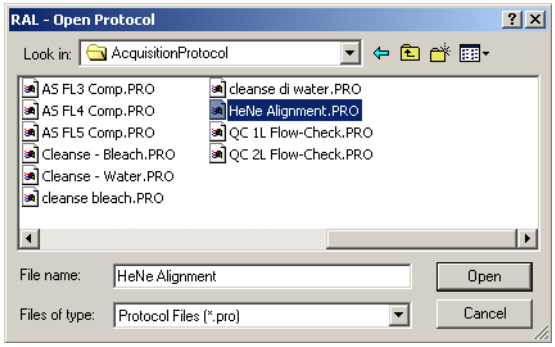
Note: If your instrument has an optional red solid-state laser, call your Beckman Coulter Representative for any adjustments.

Adjustments should be made when the FL4 mean channel values of the integral signal intensity:

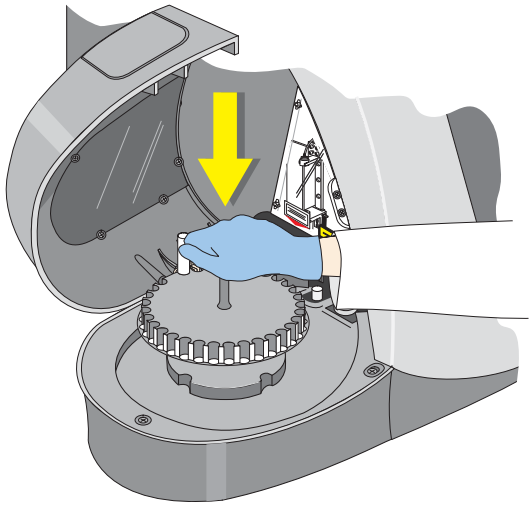
- Vary more than ±5% from the Mean integral signal channel within 24 hours, or
- Vary more than ±5% over a 7 day period.

1 Select the HeNe alignment protocol which contains the FL4 Lin/AUX (FL4 Peak) histogram gated on the Flow-Check 675 fluorospheres:

- **File ▸▸ Protocol**.
- Select **HeNe Alignment.PRO** from the list of protocols.
- OK.



2 Place a sample tube containing Flow-Check 675 fluorospheres (or the same Flow-Check fluorospheres mixture that you used for your daily QC) into the carousel.



3 Put the carousel into the MCL sample loader.

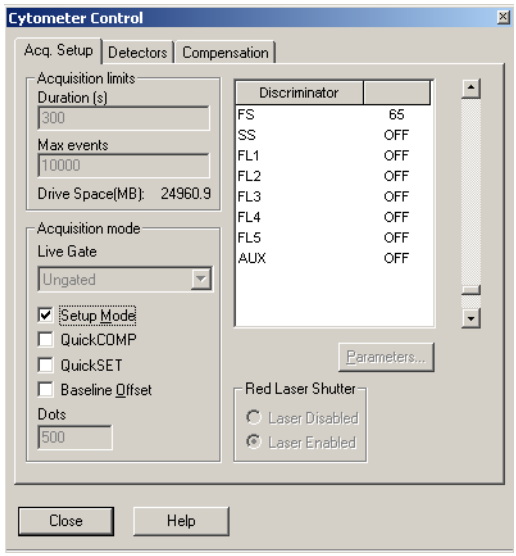
Close the MCL cover.

4 Enter the **Carousel No**. in the Worklist. The tube **Location** number automatically appears.

Carousel No.	Location
56	1

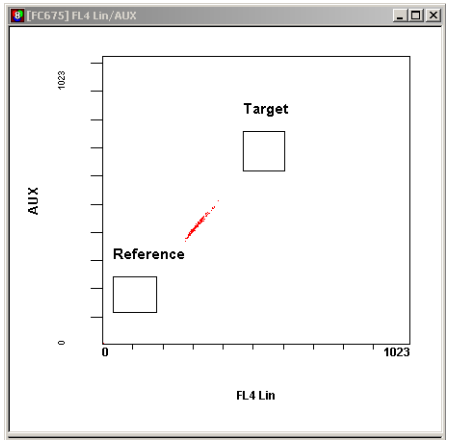
5  to start acquisition.

6 Setup Mode on the Cytometer Control Acquisition Setup Tab.



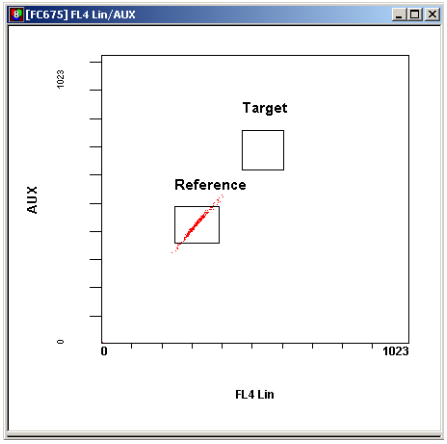
7 View the rectangular regions in the FL4 Lin/AUX (FL4 Peak) plot.

When the HeNe laser is out of alignment, the fluorospheres population typically appears in the lower left portion of the plot.

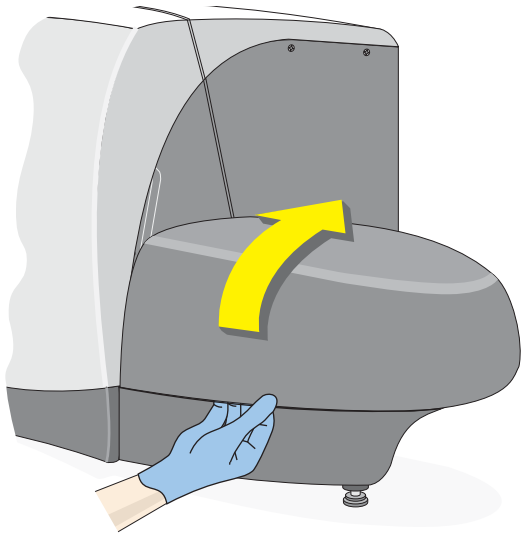


8 Select and drag the Reference region to center it on the fluorospheres population.

This is just a visual aid to reference the fluorospheres population location prior to adjustment.



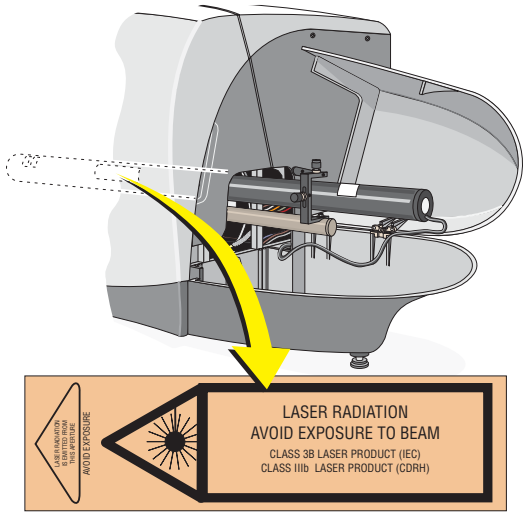
9 Open the cover to access the HeNe laser.

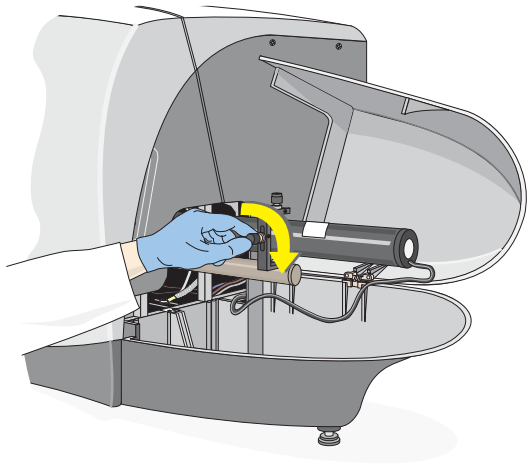


10 Turn the HeNe laser's front adjustment knob clockwise to move the fluorospheres population up and to the right.

If the population starts to move down, turn the knob counterclockwise.

See step 11 for details.



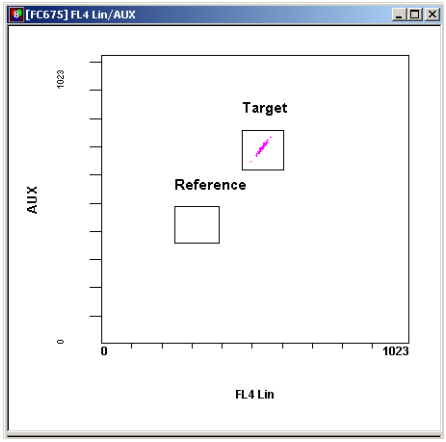


11 Move the fluorospheres population as high up and to the right as possible into the Target region (as shown).

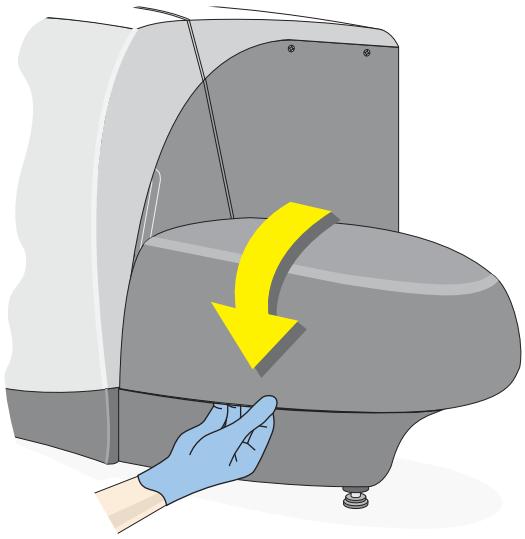
If you continue to turn the knob after the fluorospheres population moves as high up and to the right as it can, the fluorospheres population starts to move back down. To return to the best position, turn the knob in the other direction.

Note: If you cannot move the fluorospheres population into the Target region:

- Turn the HeNe laser's front adjustment knob to return the fluorospheres population into the Reference region.
- Call your Beckman Coulter representative.



12 Close the cover over the HeNe laser.

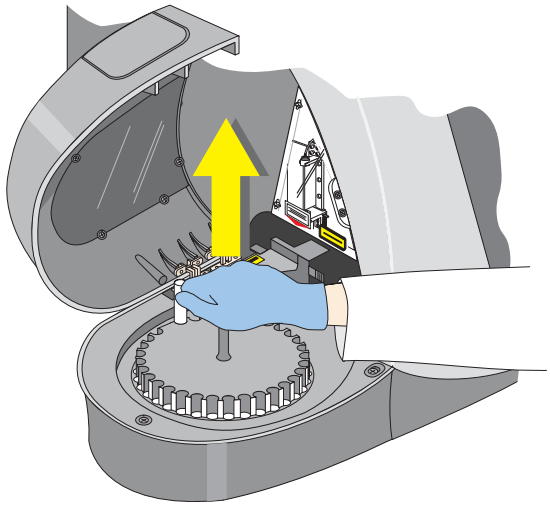


13 Deselect Setup Mode on the Cytometer Control Acquisition Setup Tab.

Acquisition stops when the count is reached.

14 When the processing is done, remove the carousel.

Close the MCL cover.



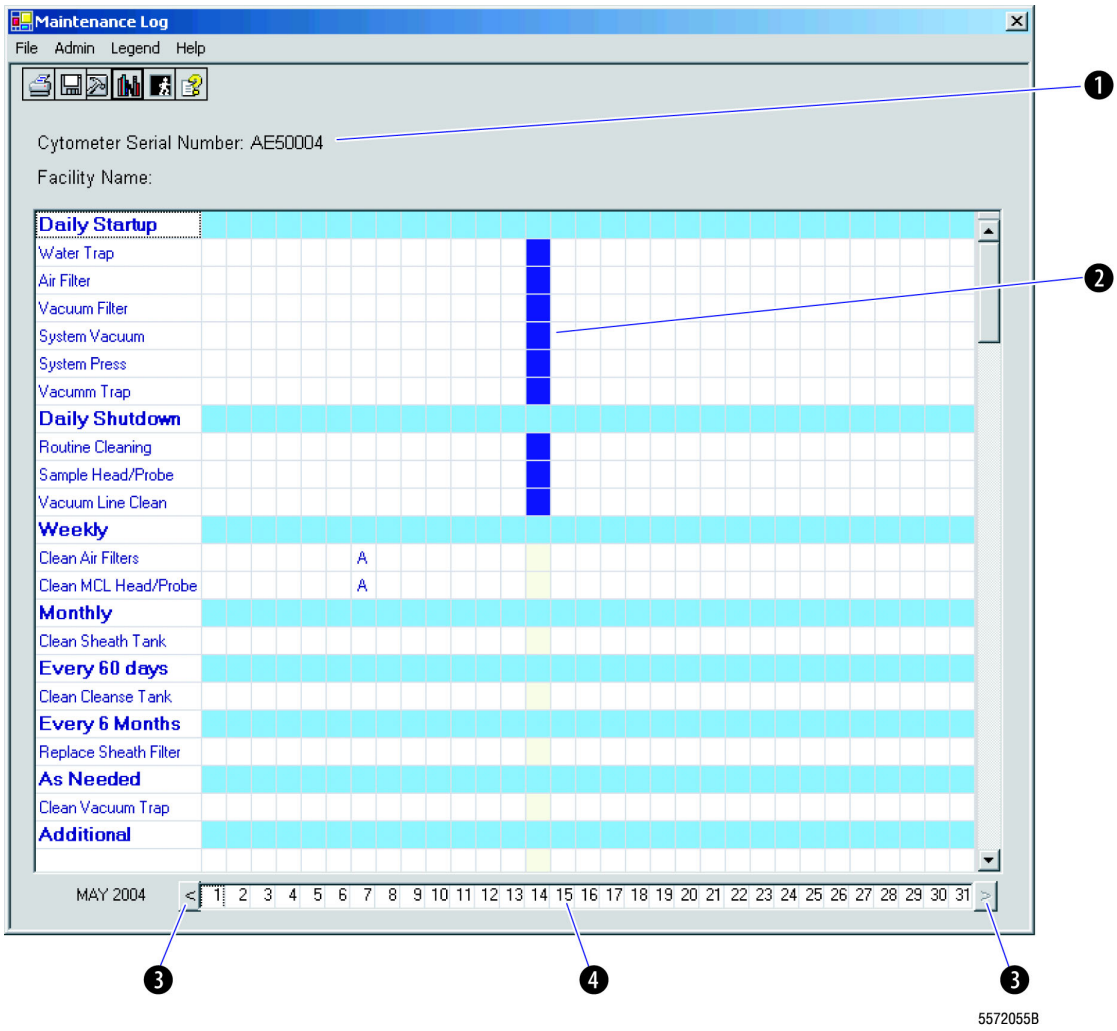
15 Run the appropriate QC Flow-Check protocol before running samples.

A.1 INTRODUCTION

The Report Generator contains two log screens you can use to record maintenance and service activities. Use the MAINTENANCE LOG to record daily and periodic maintenance. Use the SERVICE LOG to record service conditions noted and actions taken.

A.2 MAINTENANCE LOG

The Maintenance Log lists actions that need to be performed and how often they are needed.



1. The instrument serial number and facility name are displayed at the top.
2. The boxes corresponding to the current day's date are highlighted. These are the only ones that may be selected by a user.
3. The dates are shown across the bottom. The most recent month is shown by default.
4. Arrow buttons on the bottom line can be used to show other months.

Menu Options

The following menu items are available.

File Menu

The File menu has 3 options.

- **Print -** Prints the Maintenance Log of the current month.  performs the same function.
- **Save -** Saves a new entry on the Maintenance Log.  performs the same function.
- **Exit -** Exits the Maintenance Log.  performs the same function.

Admin

Prompts for the CXP Administrator password.  performs the same function.

Legend

Displays a legend that shows the list of user names and the corresponding color used for the visual display.  performs the same function.

Help

Displays the Maintenance Log help.  performs the same function.

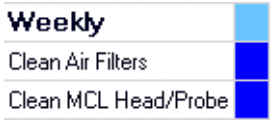
Using The Maintenance Log

The system automatically assigns letter "A" to the Administrator and assigns a unique color and letter to all other users. The color assignment is used for visual display and the letter assignment is used for printing. The letter legend is printed with the log. The pre-assigned letter "A" for Administrator is used for both the visual display and the printout.

User Entry

Double-click on a box for the current date to indicate that you have performed the specified action.

You can erase your own entry for the current date by clicking on the box again. You cannot change entries for other users or previous dates.



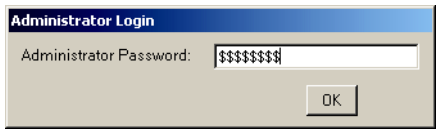
To enter a comment on any of the boxes, right-click on the box and select **Insert Comment**.

The presence of a comment in a box is indicated by a small red square in the upper right-hand corner of the box and is visible on the printout. The CXP User ID precedes the comment.

Administrator Entry

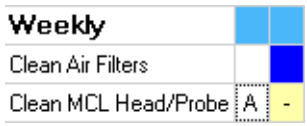
To log in, and enter the CXP Admin password.

Admin will log out when you exit the screen.



on any empty box and the letter A is displayed in the box.

Right click on any box and **Delete** to erase it and a hyphen '-' is displayed in the box.



To enter a comment on any of the boxes, right-click on the box and select **Insert Comment**. If the box already contains a comment and the Administrator adds a comment, the previous comment is replaced and the letter A precedes the comment however, the original user color designation remains in the box.

The Administrator can add a task to the bottom of the fixed list by clicking on one of the empty rows. The task is added to the section starting with the current month. A total number of 5 additional task rows are available.

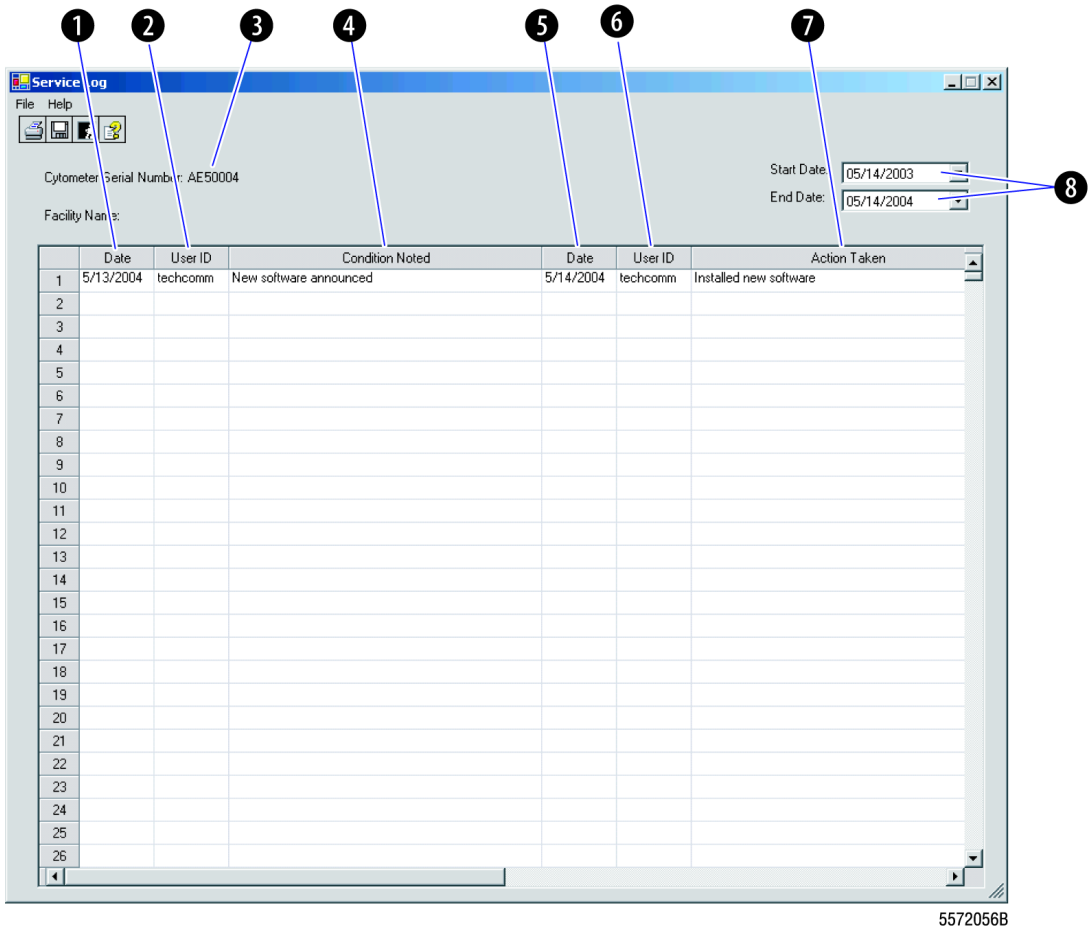
The Administrator can edit or delete any task that was added. Default (system-defined) tasks may not be edited or deleted.

To edit an added task,  on the task and make the desired changes.

To delete an added task,  on the task and press Delete.

The task is deleted from the current month going forward. A task may not be deleted if there are entries for it in the current month.

A.3 SERVICE LOG



1. Date that the Condition Noted entry was made.
2. The instrument serial number and facility name are displayed at the top.
3. User who made the entry. This field is non-editable and it is filled in automatically by the system when the Date is entered.
4. Enter text (up to 255 characters) to describe the condition noted.
5. The second Date applies to the Action Taken entry and tracks the date of the action.
6. Applies to the User who made the Action Taken entry. This field is non-editable and it is filled in automatically by the system when the Date is entered.
7. Enter text (up to 255 characters) to describe the action taken.
8. The Start and End Dates are used for visual display - the log will automatically scroll to the time period selected.

Menu Options

The following menu items are available.

File Menu

The File menu has 3 options.

- **Print -** Prints the Service Log of the current month.  performs the same function.
- **Save -** Saves a new entry on the Service Log.  performs the same function.
- **Exit** - Exits the Service Log.  performs the same function.

Help

Display the Service Log help.  performs the same function.

Using The Service Log

The Service Log is a scrollable grid with entries in chronological order.

Enter Condition Noted

1 Double-click the Date column and select the date on the calendar corresponding to the condition noted.

2 Double-click the Condition Noted field and type the text describing the condition noted.

3  to save the Service Log.

Enter Action taken

1 Double-click the Date column and select the date on the calendar corresponding to the action taken.

2 Double-click the Action Taken field and type the text describing the action taken.

3  to save the Service Log.

Start Date: and End Date:

Use these fields to display the entries between Start Date and the End Date. The log displays the time period selected. The dates are based on Condition Noted dates only.

Numerics

A

B

C

D

E

F

G

H

I

L

M

O

P

T

V

W

TRADEMARKS

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Cytomics FC 500 with CXP Software Documentation

▪ Reference PN 175570	Use and Function • Installation • Specifications • Log Sheets • Using CXP Software • Glossary • Index
▪ Special Procedures PN 175572	Cleaning Procedures • Replace/Adjust Procedures • Maintenance Log • Index
▪ Instructions For Use PN 624923	System Overview • Daily Routine • Quality Control • Running Samples • Operation Principles • Troubleshooting • How To... • Bar-Code Specifications • References •Index
▪ Master Index PN 175653	Combined index for the Instructions For Use, Special Procedures, and Reference manuals.
▪ Getting Started PN 175652	Overview of the system hardware and software.
▪ Operator Manuals CD-ROM PN 177628	HTML file of the System Help • PDF files of the Reference manual, Instructions for Use, and Special Procedures manual.

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