



NxSTEPS® Home Therapy Quick Reference Guide



HOW DO I USE THE SYSTEM ONE™ CYCLER?

HOW DO I ENTER MY TREATMENT INFORMATION?

HOW DO I MANAGE PUREFLOW™ SL?

HOW DO I TROUBLESHOOT COMMON ALARMS?

HOW DO I RECOGNIZE A PROBLEM?

Disclaimer

NxStage has prepared this document as a supplement to existing labeling and training materials. It is not intended to replace the NxStage System One or PureFlow SL user guides or the cartridge instructions for use.

Patients, care partners, and providers must review and refer to the System One and PureFlow SL user guides and cartridge instructions for use for all Instructions, warnings, and precautions.

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Chapter 1: How do I use the System One cycler?

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Preparing for treatment

Setting up

1. Wash your hands.
2. Gather the supplies and inspect for damage.
3. Make sure that the dialysate matches the patient's prescription.
4. Open the cycler door.
 - › Lift up the front handle until it clicks.
 - › Pull the handle toward you to open the door.
5. Turn the cycler power switch **ON**.
 - › The yellow caution window flashes.
6. Remove the 1-L bag of normal saline from the package.
7. Hang the saline bag on the IV pole.

Loading the cartridge

1. Remove the cartridge from its package carefully.
2. Tighten all of the connections and caps on the lines.
3. Remove the paper tape, line organizer, and connector tabs, if present.
4. Insert the cartridge into the cycler.
5. Press air detector tubing segments into the cycler.
6. Close the door of the cycler.
7. Push down the door handle until it clicks to lock it.



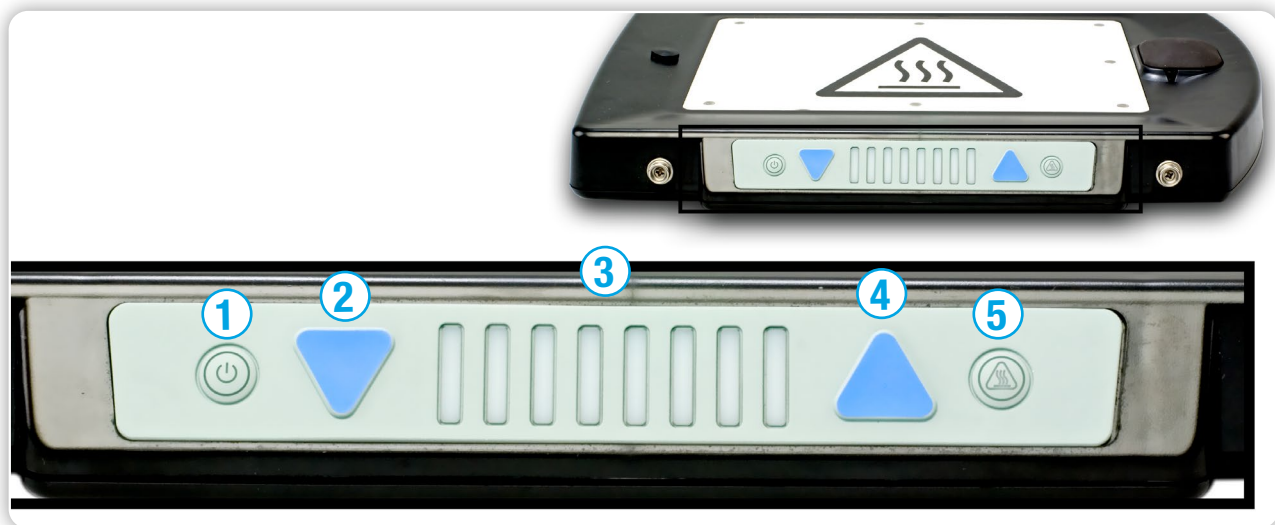
Insert the cartridge into the cycler

If using the Express Fluid Warmer:

1. Place a 5-liter bag directly on top of the heater plate.

Note: Ensure that the bag is fully covering the dialysate bag sensor and that the bag label is faced up.

2. Align the left side of the bag with the left side of the fluid warmer.
3. Make sure to snap the cover onto the snaps on the back of the fluid warmer.
4. Bring the cover over the bag.
5. Attach the snap-on buttons to the front of the fluid warmer.
6. Plug the power interconnect cord into the cycler.
7. Check that the self-test completes successfully.
 - › The status lights flash red, yellow, and then green.
8. Press the **UP**  arrow key four times, until you see four light bars of the comfort setting lights light up on the fluid warmer.



Parts of the Express Fluid Warmer

- | | | |
|----------------------------------|-------------------------------------|--------------------------------------|
| 1 Standby indicator light | 3 Comfort setting light bars | 5 Hot surface indicator light |
| 2 Down arrow | 4 Up arrow | |

Completing the prime and alarms test

Testing the fluid detection sensor

1. Moisten a clean cloth with tap water.
2. Touch the sensor's bars.
 - › If the sensor is working properly, the alarm sounds.
3. Dry the sensor.
4. Position the sensor in the cyclor base.

Priming the cartridge

Before treatment, the cartridge lines and dialyzer must be flushed with saline to eliminate all air.

1. Wash your hands.
2. Put on gloves.
3. Insert the cartridge priming spike into a 1L bag of saline, using a twisting motion.
 - › The tip of the priming spike should be visible in the saline bag.
4. Attach the access pressure pod.
 - a. Hold the pressure pod monitoring line behind the locking collar.
 - b. Insert the tip of the line into the connector on the right side of the cyclor.
 - c. Twist the tip a quarter ($\frac{1}{4}$) turn to the left to seal the connection.
 - d. Tighten the locking collar.
5. Press **ADD FLUID**  on the cyclor.
6. Secure the waste line extension with the yellow clamp to the IV pole.
7. Put the end of the waste line extension in the drain.



The tip of the priming spike in the saline bag.



Access pressure pod monitoring line attached



Note: If preferred, you may prepare the dialysate source during prime. For more information, see "Preparing the dialysate source" on page 12.

IMPORTANT: Do not make cartridge or patient connections until ALL of the following occurs:

- ✓ Prime and alarms tests are complete.
- ✓ The air has been removed from the cartridge and dialyzer (snap and tap).
- ✓ The Rate screen displays on the cyclor.

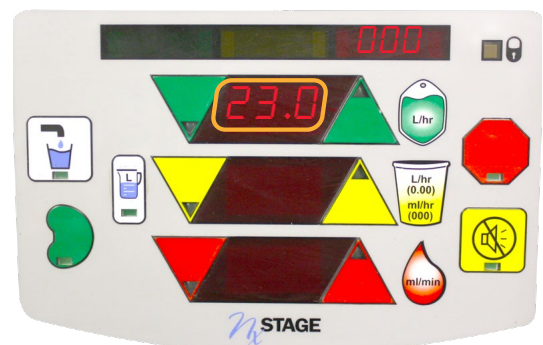
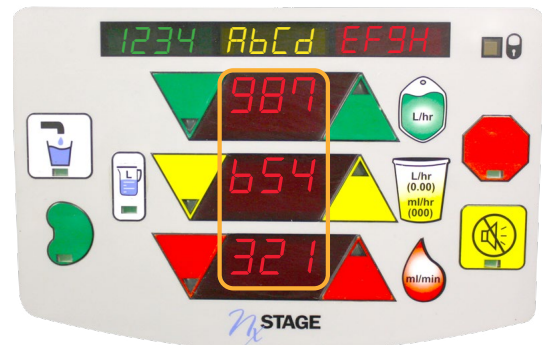
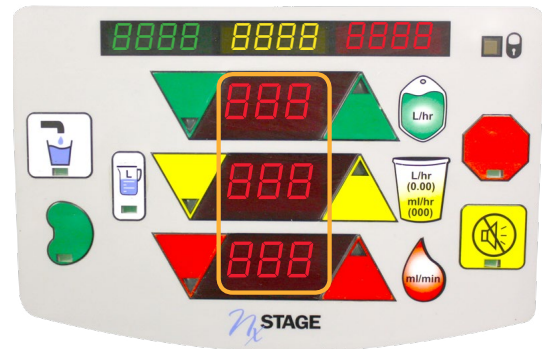
Verifying the prime and alarms test

When priming is complete, do the following:

1. Look at the control panel and verify the following:
 - › The number **8** appears in the status bar windows.
 - › The number **8** appears in all three rate/volume windows.
 - › An alarm sounds.
2. Press **MUTE** .
3. Check that the display test appears on the screen and that you hear an alarm.
 - The following numbers and letters appear:
 - › In the status bar windows:
 - › **1234, AbCd, EFgH.**
 - In the three rate/volume windows:
 - › **987, 654, 321.**
4. Press **MUTE** .
 - The following numbers appear:
 - › In the alarm status bar window: **000**
 - › In the dialysate rate/volume window: **23.0**



Note: If you don't see the numbers displayed as shown, call NxStage Technical Support.



5. Verify that the cyclor is now in recirculation mode.

During recirculation, the blood and fluid pumps are running. The pumps circulate fluid through the cartridge and saline bag.

- Do not press **STOP**.
- Do not close the clamps.
- Do not disconnect the lines.

IMPORTANT: Do not make cartridge or patient connections until ALL of the following occurs:

- ✓ Prime and alarms tests are complete.
- ✓ The air has been removed from the cartridge and dialyzer (snap and tap).
- ✓ The Rate screen displays on the cyclor.

Removing the air from the cartridge

Observe the blood circuit for air. If you see any air, remove the air starting with the arterial blood line (red clamp) and ending with the venous blood line (blue clamp).

1. Starting at the red clamp on the priming spike, snap and tap the arterial blood line (red clamp).
2. Remove the dialyzer from the cartridge tray.
3. Flip the dialyzer over so that the blue side faces up.
4. Tap the dialyzer against your palm or a soft surface.
5. Put the dialyzer in the filter holder so that the post-dialyzer port faces up.



Note: Make sure there are no kinks in the blood line when placing the dialyzer in the filter holder.



Remove air from the cartridge lines

6. Prime the post-dialyzer port.
 - › Loosen the cap on the post-dialyzer port line to allow the air to escape.
 - › Tighten the cap on the post-dialyzer port line.
7. Close the blue clamp on the post-dialyzer port securely.

If using CAR-172:

Prime the heparin line with the white clamp.

- a. Loosen the cap on the heparin line until saline flows out.
- b. Tighten the cap on the heparin line.
- c. Close the white clamp on the heparin line securely.

8. Move to the venous blood line (blue clamp) where it exits from the dialyzer and goes into the cyclor.
9. Snap and tap the venous blood line from where it exits the top of the cyclor door and move towards the priming spike.
 - › Follow the venous blood line from where it leaves the dialyzer to the blue clamp on the priming spike. Repeat snap and tap rechecking patient lines for any remaining air.
10. Press **STOP** .
11. Prime the saline "T" (short line with a white clamp) on the arterial blood line.
 - › Loosen the cap on the saline "T" to allow the air to escape.
 - › Tighten the cap on the saline "T."
12. Close the white clamp on the saline "T" securely.

Preparing the dialysate source

If using the PureFlow SL:



Note: Always check chloramines before using a new batch.

1. Press **GO**  on the PureFlow SL.
 - › The control panel shows the message “Config to Use Batch.”
2. Press **GO**  again.
 - › The control panel shows the message “Batch in Use.”
3. Close the green clamp below the 1.2 micron filter on the SAK dialysate outlet line.
 - › Do NOT close the green non-reopening clamp on the dialysate outlet line.

For complete details of connecting the PureFlow SL to the cartridge, see “Connecting to the cartridge” on page 49.

If using the Express Fluid Warmer:

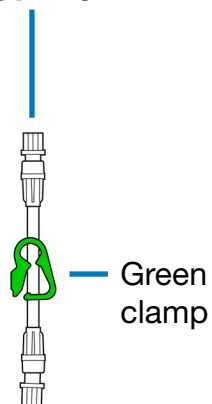
1. Hang the dialysate bags on the IV pole.



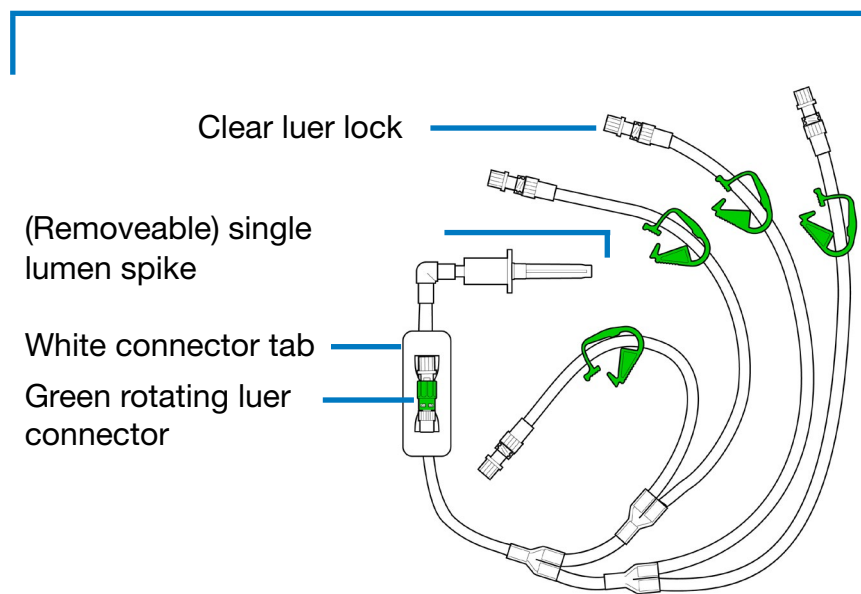
Note: The Express Fluid Warmer IV pole safely holds 21 L of fluid, using 2 hooks per dialysate bag.

2. Make sure that all caps on the Multi-Line Adapter (MLA) are finger-tight and all green clamps are open.

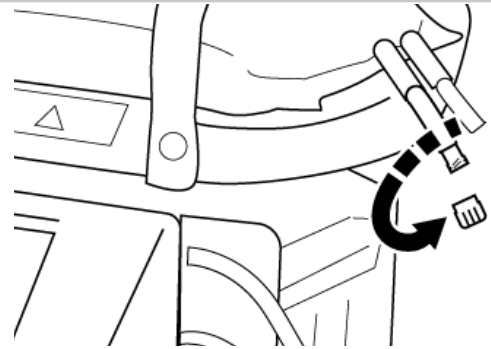
Short dialysate outlet line



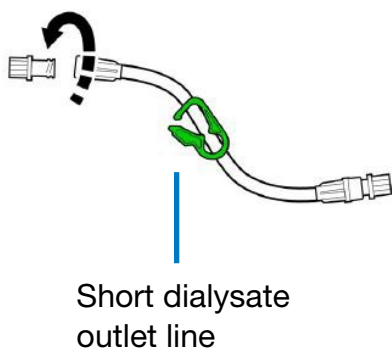
Multi-Line Adapter (MLA)



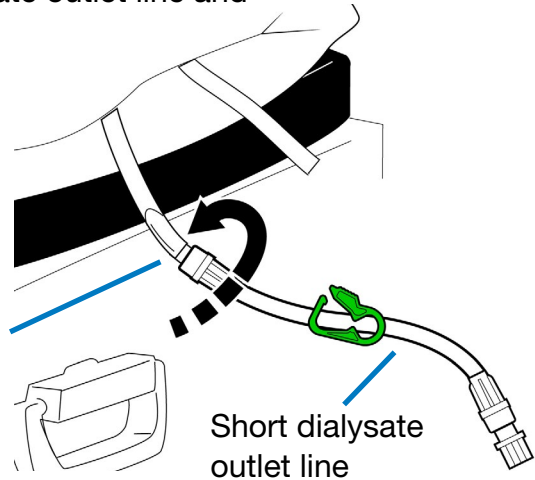
3. On the fluid warmer dialysate bag, remove the cap from the dialysate outlet port closest to the cartridge.



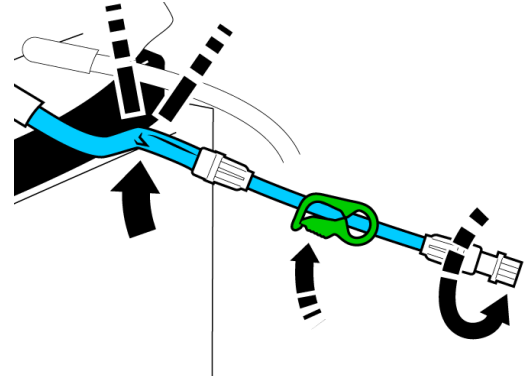
4. Remove the cap from one end of the short dialysate outlet line and connect it to the fluid warmer dialysate bag.



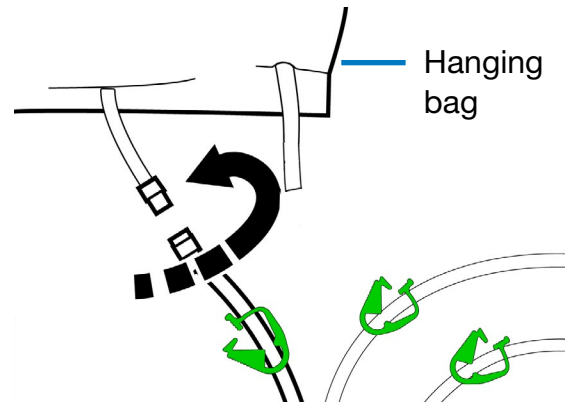
Dialysate outlet
luer port



5. Break the frangible in the dialysate bag's outlet port.
 - a. Prime the short dialysate outlet line and finger-tighten the cap.
 - b. Close the green clamp on the short dialysate outlet line.



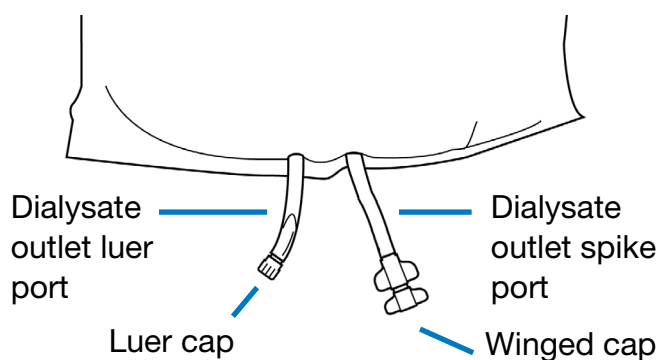
6. For each of the hanging dialysate bags:
 - a. Remove the cap from the port.
 - b. Connect one line from the MLA with a clear luer connection to the bag.
 - c. Finger-tighten the connections.



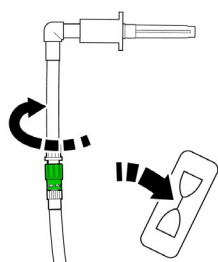
If using the Express Fluid Warmer:

- Identify which type of dialysate bags are used. The MLA has a removeable spike to accommodate either bag configuration.

Option A: Spike and luer port



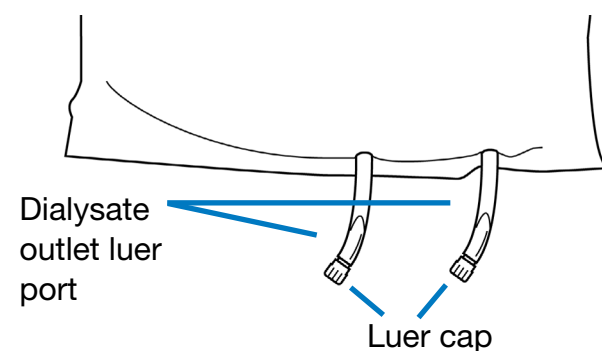
- On the fluid warmer dialysate bag, twist off the winged cap from the dialysate outlet spike port.
- If your MLA has a white connector tab, remove it, then tighten the spike and green luer connection on the MLA by twisting clockwise.



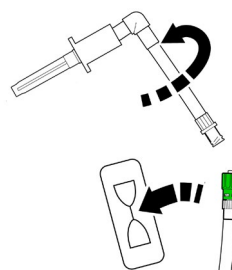
- Remove the cap from the MLA spike and insert the spike into the bag on the fluid warmer.
- Make sure there are no kinks in the lines.
- Break the frangibles on the hanging bags.
- Prime and close the clamps on any unused MLA lines.
- For complete details of connecting the dialysate bag to the cartridge, see "Making the cartridge connections" on page 15.

Refer to the Express Fluid Warmer User Guide for additional information.

Option B: Two luer ports



- On the fluid warmer dialysate bag, remove the luer cap from the remaining port.
- If your MLA has a white connector tab, remove it, then remove the spike assembly from the MLA line by twisting counterclockwise and discard.



- Connect the green rotating luer connector of the MLA line to the port of the dialysate bag that is resting on the fluid warmer.
- Make sure there are no kinks in the lines.
- Break the frangibles on the fluid warmer bag and hanging bags.

Making the cartridge connections

After the Prime and Alarms test and the display tests, make non-patient connections to the cartridge.

IMPORTANT: Do not connect the patient lines at this time.

Making the fluid line connections

1. Locate the saline line at the priming spike and follow the line to the white and green clamps.



Note: The saline line is connected to the dialysate fluid inlet line.

2. Clamp the saline line (white clamp) and the cartridge dialysate inlet line (green clamp).
3. Disconnect the saline line from the cartridge dialysate inlet line.
4. Keeping the lines sterile, connect the saline line (white clamp) to the saline “T” on the arterial blood line.



Note: Do not open the white clamps.

5. Connect the dialysate inlet line (green clamp) to the dialysate source, which is either the PureFlow SL or the Express Fluid Warmer bags.
6. Open both green clamps.

Making the waste line connections

If using the PureFlow SL:	If using the Express Fluid Warmer:
1. Locate the waste line (yellow clamp) at the priming spike. 2. Close the yellow clamps on the waste line. 3. Disconnect the waste line from the priming spike. 4. Connect the waste line to the waste line adapter on the PureFlow SL control unit. 5. Open the yellow clamps on the waste line and the waste line adapter.	1. Locate the waste line (yellow clamp) at the priming spike. 2. Close the yellow clamps on the waste line and the priming spike. 3. Disconnect the waste line from the priming spike. 4. Connect the waste line (yellow clamp) to the waste line extension (yellow clamp). 5. Place the end of the waste line extension into an appropriate plumbing drain, such as a tub or sink. 6. Open the yellow clamps on both lines.

Performing the treatment

Entering the treatment settings

“Enter settings to do, then move
red and blue.”

Before treatment, enter the treatment settings on the cyclor, using the Rate and Volume screens. For more information on the treatment settings, see page 32.

.....

Volume screen:	Confirm dialysate volume
	Set ultrafiltration volume
Rate screen:	Confirm or set dialysate rate
	Set ultrafiltration rate
	Confirm blood flow rate

.....

Remember:

- The starting blood flow rate is typically 200 mL/min, which is then increased to the prescribed treatment rate.
- If using bagged dialysate, the maximum dialysate rate is 12 L/hr.
- Always determine the ultrafiltration volume target correctly by subtracting an accurate dry weight from an accurate pre-dialysis weight.
- Make sure that the dialysate volume displayed matches the prescription.
- Pressing **TREATMENT**  on the cyclor starts dialysate delivery on the PureFlow SL.

Making the patient connections

After priming the cartridge and entering your treatment settings, it is time to connect the patient lines using universal precautions and aseptic technique as taught by your center.

1. Follow aseptic technique to establish the vascular access.
2. Take blood samples, if ordered.
3. Give anticoagulant as prescribed.
4. Close the red and blue clamps on patient line and priming spike.
5. Disconnect the arterial blood line (red clamp) from the priming spike.
6. Connect the arterial blood line (red clamp) to the arterial vascular access line.
7. Connect a sterile luer-lock syringe to the red port on the priming spike.*
8. Disconnect the venous blood line (blue clamp) from the priming spike.
9. Connect the venous blood line (blue clamp) to the venous vascular access line.
10. Connect a sterile luer-lock syringe to the blue port on the priming spike.*
11. Open the four red and blue clamps on the arterial and the venous blood lines and the vascular access lines.
12. Fill each 10 mL syringe attached to the priming spike with 10 mL of saline.*
13. Close the red and blue priming spike clamps.



The patient lines attached.



= Follow the CMS policy about saline syringes in the designated treatment area.

Before starting the treatment, check the following:

- The dialyzer is in the filter holder with the post-dialyzer port upright.
- None of the fluid lines are kinked.
- The blue clamp on the post-dialyzer port is closed.
- The cartridge waste line (yellow clamps) is connected to the waste line extension or to the PureFlow SL waste line adapter and all clamps are open.
- The arterial and venous blood lines (red and blue clamps) are visible, have no kinks, are connected securely to the vascular access lines, and all clamps are open.
- All connections and caps are tight.
- The white clamps on the saline line and saline “T” are closed.
- The dialysate source is connected to dialysate inlet line (green clamp) and all clamps are open.
- If the patient is using the CAR-172 and the heparin infusion line is not being used, be sure that the clamp on the heparin line is closed and that the cap is closed tightly.



The cycler set up for treatment

Starting the treatment

1. Press **TREATMENT**  on the cycler.
2. Increase the blood flow rate to the prescribed rate.
3. Monitor the arterial and venous access pressures.

If the arterial access flow is poor, the blood flow rate may be too high. This can cause small air bubbles in the arterial blood line (red clamp), resulting in an Alarm #11: Check for arterial air during TREATMENT.



Note: The cycler shows the arterial access pressures without a negative sign.

Monitoring the treatment

Once treatment has started, you see Caution #7, and then Caution #8. During treatment, Caution #2 occurs regularly.

Do the following during treatment:

1. Resolve all alarms and cautions.

The blood lines and dialyzer can begin clotting when the cyclor blood pump is off.

Repeatedly pressing **MUTE**  **-STOP** 

-TREATMENT  on the cyclor during an alarm without addressing the cause of the alarm increases the potential for clotting.

2. Check for air in the venous header of the dialyzer.
 - a. If there is air, remove the air from the post-dialyzer port line with a 20 mL luer-lock syringe.
 - b. Flush the line with 3 mL of saline to clear the blood and then close the blue clamp.
3. Make sure that the needles and the blood lines are taped securely and visible at all times.
4. Verify that the arterial and venous access pressures are within the expected ranges.
 - › A normal arterial pressure is between -50 and -200 mmHg.
 - › A normal venous pressure is between 20 and 300 mmHg.
5. Check that the white clamps on the saline line and saline "T" are closed.
6. Observe the blood circuit for signs of clotting.
7. Inspect the system periodically for evidence of leaks.



Checking the saline bag

If using the Express Fluid Warmer:

1. Check that the dialysate bag on the warmer is full of dialysate.
2. Confirm that the dialysate bags have enough fluid and are draining evenly.

Ending the treatment

The treatment ends when the volume targets are met. At the end of treatment, the following occurs:

- The yellow caution status window shows **000**.
- The dialysate and ultrafiltration rate windows show **0**.
- The blood pump continues to run.

Performing an automated rinseback

1. Check the saline bag to make sure it has 300–500 mL left when volume targets (ultrafiltration volume and total dialysate delivered) are met.
2. Press **STOP** .
The rinseback volume is displayed.
3. Wash your hands and put on clean gloves.
4. Close the red clamp on the arterial blood line.
5. Disconnect the arterial blood line (red clamp) from the arterial vascular access line.
6. Connect the arterial blood line (red clamp) to the priming spike line with the red clamp.
7. Open the red clamps on the arterial blood line and on the priming spike.
8. Press **ADD FLUID** .
The rinseback volume number counts down to zero (**0**).
9. When rinseback is complete, close the blue clamp on the patient's venous vascular access line.
10. Close the blue clamp on the venous blood line.
11. Disconnect the venous blood line (blue clamp) from the venous vascular access line.
12. Connect the venous blood line (blue clamp) to the priming spike line with the blue clamp.
13. Remove the fistula needles and care for the access site.
 - › If using a CVC, follow the centre's policy for the catheter limbs.

1. Press the **VOLUME TOGGLE** to see the treatment summary information.
2. Record the following information:
 - › Total treatment time.
 - › Total dialysate delivered.
 - › Total ultrafiltration removed.
 - › Total blood processed, in liters.



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Maintaining the cyclor

Cleaning and disinfecting equipment after every treatment

Clean and disinfect all exterior surfaces of your dialysis equipment after each treatment.

1. Close the cyclor door.
2. Use a paper towel and mild detergent (such as a dishwashing liquid) to clean all exterior surfaces.



Note: Do not pour solution onto or allow fluid to drip inside the equipment.

3. If you see blood on any surfaces, disinfect the cyclor using a bleach solution prepared according to the table below. Allow the solution to remain in contact with the surface for 10 minutes.

Sodium hypochlorite concentration	Water-to-bleach solution
5.0% - 5.9%	Add 16 oz water and 2 oz household bleach
6.0% - 6.9%	Add 20 oz water and 2 oz household bleach
7.0% - 7.9%	Add 24 oz water and 2 oz household bleach
8.0% - 8.9%	Add 28 oz water and 2 oz household bleach



Note: Most common household bleaches have a concentration of 5.25% - 6.15% sodium hypochlorite. Refer to the product label for the actual strength of the product.

4. Throw away used cleaning supplies.

Cleaning the blood leak detector

Clean the detector at least once a month or more frequently if needed.

- › Remove all jewelry before putting your hand inside the cyclor.
- › Camera or eyeglasses lens cloths can be used for cleaning the detector and mirror.
- › Do not touch other sensors during this procedure.

1. Unplug the cyclor.
2. Open the door of the cyclor.
3. The blood leak detector is inside the cyclor, on the left.
4. Look for the mirror directly across from the blood leak detector.
5. Moisten a clean, soft, lint-free cloth with tap water.
6. Wipe the blood leak detector and mirror to remove dust and debris.
7. Dry the blood leak detector and mirror with a new dry lint-free cloth.
8. Throw away used cleaning supplies.

Common procedures

Performing an emergency rinseback

Use emergency rinseback when you need to return blood quickly. Do not return blood if blood circuit is clotted or hemolyzed, air is seen in the blood circuit or in the patient blood lines, or if blood flow stops for an extended time.

1. Make sure there is enough saline to rinse back the blood.



Note: There must be 300-500 mL of saline available to rinse back blood.

2. Open the white clamps on the saline line and saline “T.”
3. Check the flow of saline.
4. Close the red clamp on the arterial blood line.
5. Let the saline infuse the blood lines to return the blood to the patient.
6. Press **STOP**  on the cyclor when the venous blood line (blue clamp) is clear.
7. Close the clamps on the vascular access lines.
8. Close the red clamp on the arterial blood line.
9. Disconnect the arterial blood line from the vascular access.
10. Connect the arterial blood line to the red port on the priming spike.
11. Close the blue clamp on the venous blood line.
12. Disconnect the venous blood line from the vascular access.
13. Connect the venous blood line to the blue port on the priming spike.
14. Turn the cyclor power switch **OFF**.
15. Remove and appropriately throw away disposables.

If using the Express Fluid Warmer:

Check the warmer to see if the **STANDBY** indicator lights are lit. If not, do the following:

1. Press the **DOWN**  arrow until all of the comfort setting lights turn off and the **STANDBY**  indicator lights are lit.
2. Make sure the hot surface light is off.
3. Remove the warmer disposables.
4. **Disconnect the interconnect power cord.**

Ending treatment without returning your blood

There are times when rinseback cannot be performed, for example during a power failure, a recurring alarm, if the blood circuit is clotted or hemolyzed, air is seen in the patient blood lines, or another problem that cannot be resolved.

1. Press **STOP** to stop the treatment and stop all fluid pumps.
2. Turn the cyclor power switch off.
3. Disconnect from the cartridge.
 - a. Close the red clamps on the arterial blood line and the arterial vascular access line.
 - b. Disconnect the arterial blood line (red clamp) from the vascular access and connect to the priming spike.
 - c. Close the blue clamps on the venous blood line and the venous vascular access line.
 - d. Disconnect the venous blood line (blue clamp) from the venous vascular access and connect to the priming spike.
4. Care for the access site, following the instructions from your center nurse.
5. Follow the disposal guidelines, as taught by your center, on page 21.
6. Call your center immediately to report the problem you experienced and the blood loss.

Delivering a manual fluid bolus

1. Make sure there is enough saline available (between 300- 500 mL) for the bolus.
2. Make sure the saline line is primed.
3. Open the white clamps on the saline line and saline “T.”
4. Give the desired fluid volume.
5. Close the white clamps on the saline line and saline “T”.
6. Write down the amount of saline given and add the volume delivered to your ultrafiltration volume.



Note: This procedure can be used to check the dialyzer for clotting, if required. The dialyzer is best seen if the red clamp on the arterial blood line is closed while saline is given. Open the red clamps on the arterial blood line after the bolus.

Reducing the UFR quickly

1. Press and hold **STOP** .
 - › The dialysate and UF rate windows show three zeros (000).
 - › The yellow caution window shows three zeros (000).
 - › The pump on indicator lights turn off.
 - › The blood pump continues to run.
2. Treat the patient's symptoms following your centre's procedure.



For example: Give a saline bolus or decrease the UF rate and/or volume.

3. Press **TREATMENT**  to resume the treatment.

Ending the treatment early

1. Press and hold **STOP** .
2. Press **STOP**  again.
 - › Begin the normal "Ending the treatment" on page 20.
 - › Continue to "Performing an automated rinseback" on page 20.

Resetting the access pressure pod

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for	Do
Access pressure pod connection error: The monitoring line is leaking, poorly connected, or not connected.	Follow the procedure below to reset the access pressure pod.
The access pressure pod monitoring line has a kink in it.	Remove the kink in the access pressure pod monitoring line.

Reset the access pressure pod as follows:

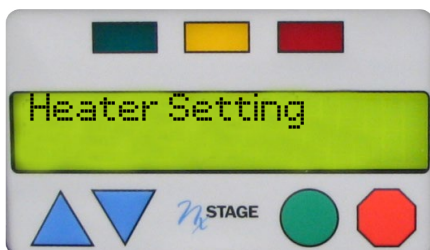
- 1. Disconnect the access monitoring line from the cyclor.
 - › The access pressure pod deflates.
- 2. Press **STOP** .

If the pod fills immediately:	If the pod does not fill immediately:
a. Attach the access pressure pod monitoring line to the connection point on the cyclor. b. Press TREATMENT  to resume the treatment. c. Confirm that arterial pressures are within range.	a. Close the red clamp on the arterial blood line. b. Open the white clamps on the saline line and saline "T." c. The pod fills with blood. d. Close the white clamps on the saline line and saline "T." e. Open the red clamp on the arterial blood line. f. Attach the access pressure pod monitoring line to the connection point on the cyclor. g. Press TREATMENT  to resume the treatment. h. Confirm that arterial pressures are within range.

Adjusting the dialysate temperature

If using the PureFlow SL:

1. Press the **UP**  or **DOWN**  arrow on the control panel to go to the heater setting.
The display shows the current setting.
2. Press the **UP**  or **DOWN**  arrows to adjust the heater setting from 0 to 20.
3. Press **GO**  or wait three seconds to return to the previous display.



Note: The heater does not turn on until there is enough fluid in the SAK. If you select "0" the heater is off.

If using the Express Fluid Warmer:

- Press the **UP**  arrow for warmer or the **DOWN**  arrow for cooler.
- One comfort setting light bar turns on or off with each time that you press the arrow.

Taking a blood sample

To draw a pre-treatment blood sample:	To draw a post treatment blood sample:
1. Put on clean gloves. 2. Draw a sample of blood directly from the arterial vascular access line.	1. Watch the cyclor display until you see 000 in the yellow caution window at the end of treatment and before RINSEBACK mode. › The dialysate and UF rate windows show three zeros (000). › The blood pump continues to run. 2. Allow the patient's blood to circulate for three (3) minutes. › Do not reduce the blood flow rate now. 3. Prepare blood collection tubes for the sample. 4. Press STOP  on the cyclor. 5. Put on clean gloves. 6. Close the red clamps on the arterial blood line and the arterial vascular access line. 7. Disconnect the arterial blood line and connect it to the red port on the priming spike. 8. Open the red clamps on arterial blood line and the priming spike line. 9. Attach the blood collection tube to the arterial vascular access line. 10. Open the clamp on the arterial vascular access line. 11. Withdraw _____ mL (typically 2 – 3 mL) of blood. 12. Close the clamp on the arterial vascular access line. 13. Follow your centre's protocols for labeling, spinning, storing and transportation of sample. 14. Remove and dispose of gloves and supplies. 15. Press ADD FLUID  on the cyclor and complete the rest of the treatment. See "Ending the treatment" on page 20.

Changing system settings

1. Turn **ON** the power switch on the back panel of the cycler.
 - › The front panel flashes “**888**” several times, goes blank, and then flashes again.
2. Listen for a beep and then quickly press and hold **TREATMENT**  to go to the System Settings menu.
3. Watch for the number 0 or 1 in the top window. You can now change System Settings.
 - › The top window displays the selected system setting number.
 - › The middle window displays the current value of that setting.
 - › If the numbers do not appear, repeat steps 1 and 2.
4. Press the top window **ADJUSTMENT ARROW UP**  or **DOWN**  to select the desired system setting.
 - › See “System Settings for NxStage System One and System One S” on page 30 for a list of the system settings by number.
5. Press the middle window **ADJUSTMENT ARROW UP**  or **DOWN**  to change the value of the setting.
6. Repeat the process for other system settings, as desired.



Note: After updating *Parameter Number 0 - Cartridge Type*, press the top window **ADJUSTMENT ARROW** to scroll through the remaining system settings. Confirm that the settings are correct before turning the cycler power off and on to save the desired settings. Failure to do so may result in an incorrect set-up error upon powering on the cycler.

Check your cartridge's instructions for use for the suggested system settings.

7. When you have finished changing the system settings, turn **OFF** the power switch on the back panel of the cycler to save the settings.

System Settings for NxStage System One and System One S

System Setting Number	Range	Suggested Setting	System Setting Name
0 [†]	0-13	0	Cartridge Type
1	5-480%		Maximum FF (flow fraction)
2	0-12 0-18 ‡		Initial Fluid (dialysate) pump rate (PR)
3	0-2.4 L/hr		Start up UF rate
4 [†]	10-600 ml/min	200	Start up blood flow rate
5	0-90.0 L	Pt's Prescribed Volume of Dialysate	Prescribed dialysate volume
12	10-220 ml	91 mL	Blood volume of the dialyzer
13 ‡	0.10-5.00	1.45	Rinseback factor
22*	0-200 mL/min	40	Dialyzer flush FP
23*	0-200 mL/min	20	Dialyzer flush UFP
24*	50-600 mL/min	250	Dialyzer flush BP
27*	40-200 mL/min	40	Prime FP
31*	0-600 mL/min	600	Recirculation BP
35**	0-60 min		Dimmed timer
36**	0-15		Dimmed caution intensity
37**	0-15		Dimmed intensity
38**	0-1		Remove rinseback volume (removed prior to UF target removal)
42**	0-1	0	Therapy target met
43**	15-60	30	Volumetric Management System Check Intervalent
47**†	50-400 mmHg	220	Access (Arterial) pressure warning limit (Caution 24)
63**	5-60 min	15	First Volumetric Management System Check
80 §	0.01-2.4 L/hr	Not to exceed 10 ml/Kg/hr ¶	Max UF rate (UFR)
81 §	.1- 12/ 18 L/hr	12 to 18 L/ hr	Max Dialysate rate (FPR)

* Settings for reducing Snap and Tap

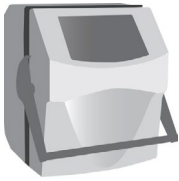
**Optional Settings for Nocturnal Treatment

† Applies to software versions 4.6 and higher (This can be ignored for reducing Snap and Tap if using software version 4.5.)

‡ Applies to software versions 4.8 and higher

§ Applies to software versions 4.10 and higher

¶ Literature suggests that UF rates below 10 ml/hr/kg improve mortality.¹1. Flythe JE et al, Rapid fluid removal during dialysis is associated with cardiovascular morbidity and mortality. *Kidney Int* 2011; 79(2): 250-257



Chapter 2: How do I enter the treatment information?

Chapter Overview

Entering the treatment settings	32
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Entering the treatment settings

Before treatment, enter the treatment settings on the cyclor using the Rate and Volume screens.

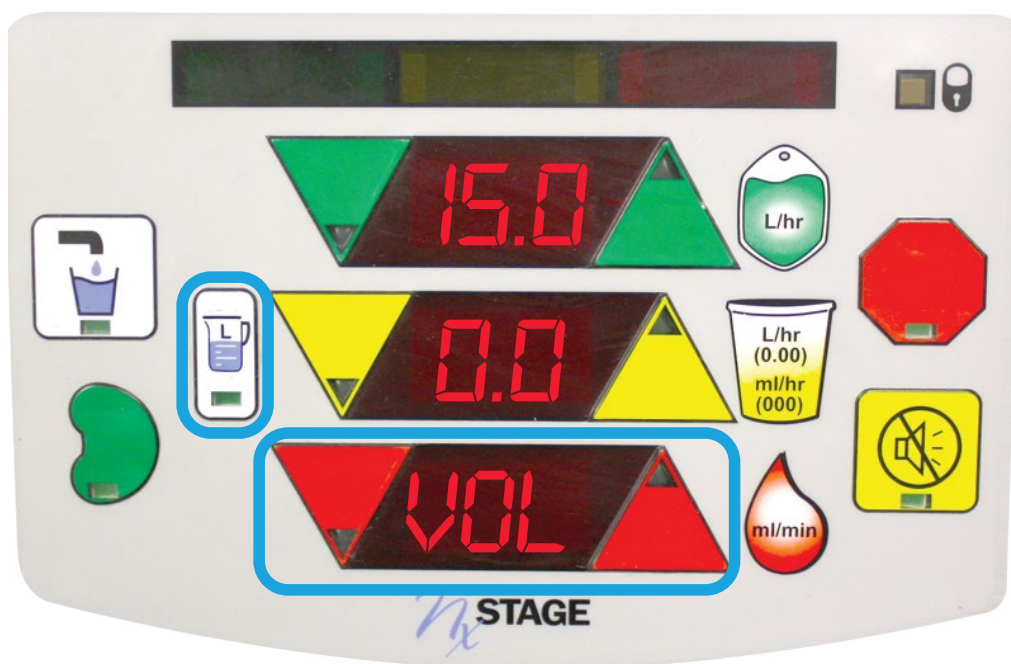
The Rate screen is the home screen. It is the screen that appears when you turn on the cyclor. Pressing the **VOLUME TOGGLE** switches the cyclor to the Volume screen. You know you are in the Volume screen because the message VOL appears in the bottom (red) status window.

Entering the volume settings

Begin entering the treatment settings on the Volume screen.

On the Volume screen, do the following:

1. Press the **VOLUME TOGGLE**  to switch the cyclor display to the Volume screen.
2. Check that the dialysate volume matches the prescription.
3. Press the green (top window) **ADJUSTMENT ARROW UP**  or **DOWN**  to make adjustments as needed.
4. Enter ultrafiltration (UF) volume for the treatment by pressing the yellow (middle window) **ADJUSTMENT ARROW UP** .
5. Press the **VOLUME TOGGLE**  to switch back to the Rate screen.



The Volume screen

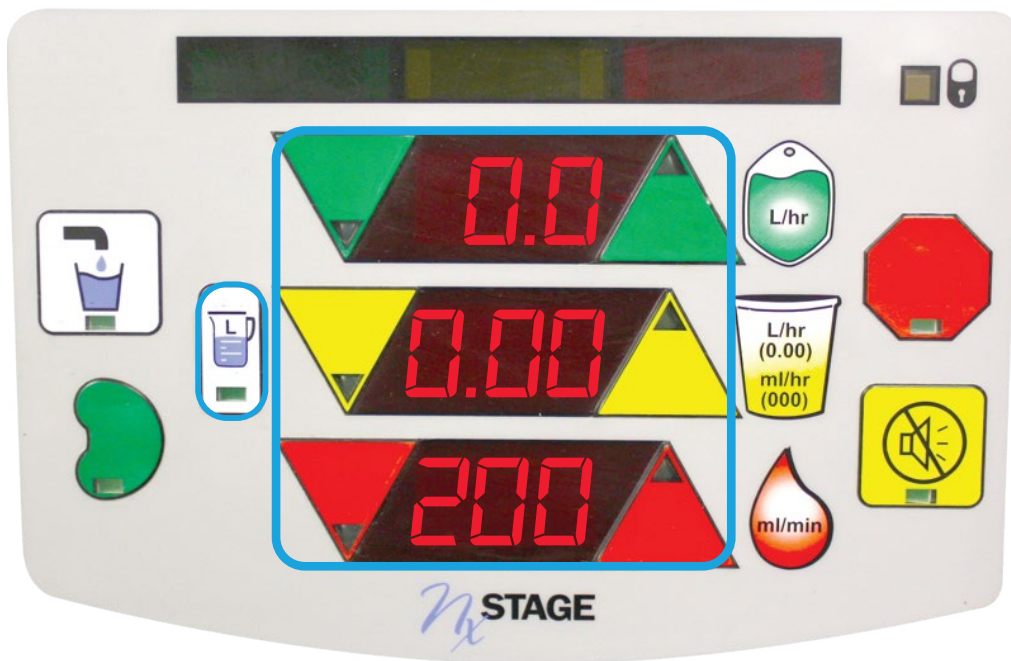
Entering the rate settings

On the Rate screen, do the following:

1. Check the blood flow rate.
2. Use the red arrows to make adjustments as needed.
 - › This rate is preset to start at 200 mL/min.
 - › After treatment has started, increase the blood flow rate to the prescribed rate.
3. Enter the ultrafiltration (UF) rate you determined by pressing the yellow up arrow.
4. Make sure that the UF fluid is not taken off too quickly. Follow your centre's direction for UF rate removal amount.
5. Adjust the dialysate rate as needed by pressing the up or down green arrow.

After you enter the required settings and reach your prescribed blood flow rate, the green status window in the upper left corner shows the flow fraction and the total treatment time.

If you see a treatment time that doesn't match the prescription or a treatment time of **99:59**, you have not entered all the required data or you have entered something incorrectly.



The Rate screen

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Chapter 3: How do I manage PureFlow SL?

Chapter Overview

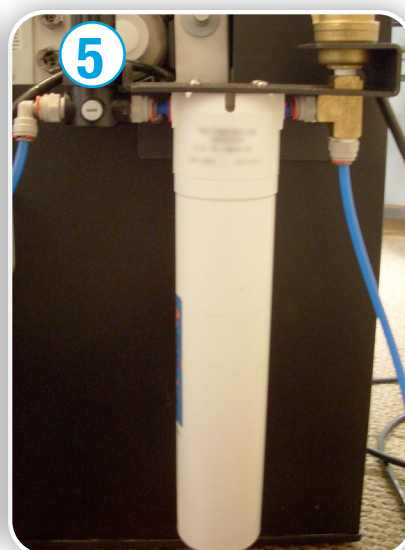
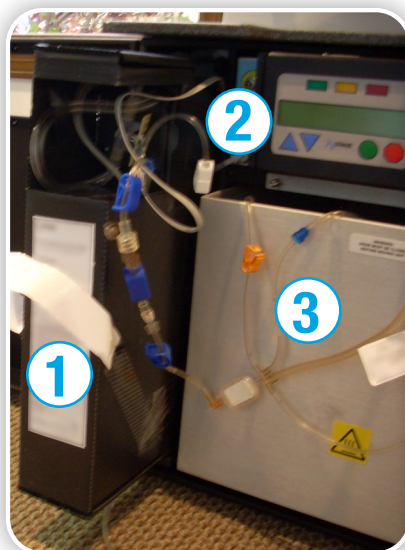
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Introduction

This quick reference guide is designed to assist you with installing and using the PureFlow SL. Refer to the *PureFlow SL User Guide* for additional information.

Parts of the PureFlow SL

- 1 Purification pack (PAK)
- 2 Control unit and control panel
- 3 Tub within cabinet
- 4 Dialysate sack (SAK)
- 5 Pretreatment kit, including the following parts:
 - › Water line
 - › Drain line
 - › Sediment filter
 - › Water source connectors



Assembling the PureFlow SL

Before using the PureFlow SL, the device must be assembled. When deciding where to place the PureFlow SL Cabinet consider the following:

- Make sure that there is at least 12 inches of space on all sides of the cabinet. Leaving this space around the system allows for easy access and prevents other items from coming into contact with the system.
- The cabinet should be near a cold water source where you will perform the therapy.

If using the standard installation:	If using the LINX® water pretreatment system:
The source water line is 40 feet long.	The source water line is 60 feet long.

Installing the control unit

- Slide the control unit into the space above the tub.
- Pull the tub open.
- Hand-tighten the two thumb screws under the front of the control unit.

Note: It is easier to tighten thumb screws if you slide out the tub.

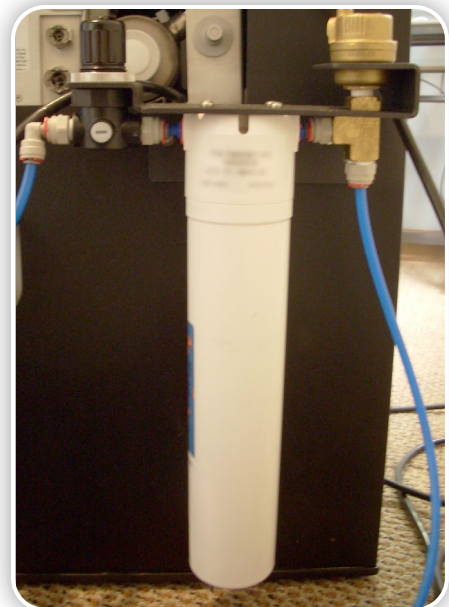
- Close the tub.

Installing the control unit



Installing the pre-treatment unit

- Place the bracket over the two screw heads on the back of the cabinet.
- Make sure that:
 - The nylon washer rests between the cabinet and the pre-treatment bracket.
 - The metal washer rests between the screw head and the pre-treatment bracket.
- Adjust the screws as necessary.
- Push down on the bracket to make sure that the pre-treatment unit is seated securely on the screws.
- Tighten the screws.
- Pull gently on the bracket to make sure that the assembly is secured to the cabinet.



Installing the pre-treatment unit

7. Adjust the air vent.
 - › First, turn the air vent clockwise until it stops.
 - › Then, turn the air vent counterclockwise a half turn.
8. Pull the yellow tab to remove the cap on the sediment filter.
9. Screw the filter onto the filter head attached to the bracket. Hand tighten.
10. Connect the blue water line from the pre-treatment unit to the blue water inlet on the back of the control panel.
 - › The connector snaps into place.
11. Connect the UV water line to the water outlet.
 - › Both water connections snap into place.



Remove the yellow cap on the sediment filter

Installing the drain line

When the PureFlow SL is in use, the drain line :

- › Must be in a drain at all times.
 - › Should not be placed lower than floor level.
 - › Should not be placed higher than three feet above the ground.
1. Attach the black drain line to the drain line connection on the back of the control unit.
 - › The connection snaps into place.
 2. Place the end of the drain line into a drain.

If using the LINX water pretreatment system:

Install the LINX water pretreatment system.

Refer to the *LINX Water Pre-Treatment System User Guide* and the *Installation and Use* video.

Connecting the water source

Use one of the following adapters:



Faucet adapter



Under sink adapter

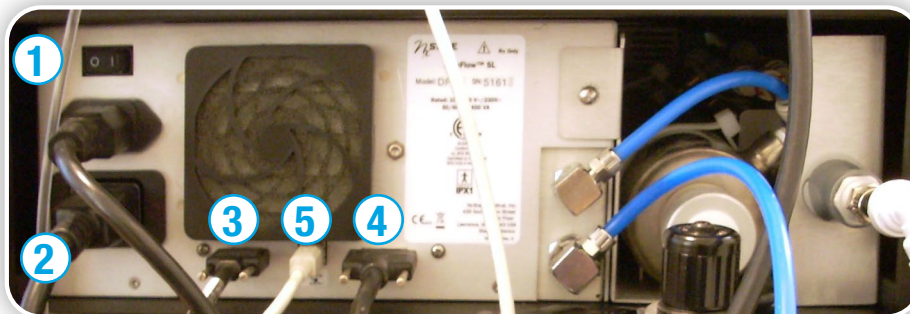


Washer hook-up adapter

If using the standard installation:	If using the LINX water pretreatment system:
1. For instructions on how to connect to your water source, refer to the <i>PureFlow SL User Guide</i>. 2. Connect the 40-foot blue PureFlow source water line to the source water supply. 3. Turn on the source water. 4. Check for leaks.	1. For instructions on how to connect to your water source, refer to the <i>LINX Water Pretreatment System User Guide</i>. 2. Connect the green LINX feed water line to the source water supply. 3. Connect the blue LINX treated water line to the PureFlow SL. 4. Turn on the source water. 5. Check for leaks.

Making the electrical connections

All electrical connections are unique. Each cord fits only one connector on the back of the PureFlow SL control unit.

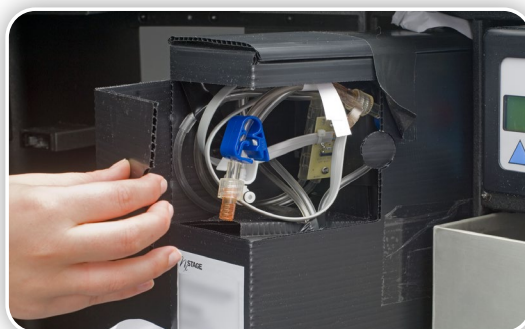
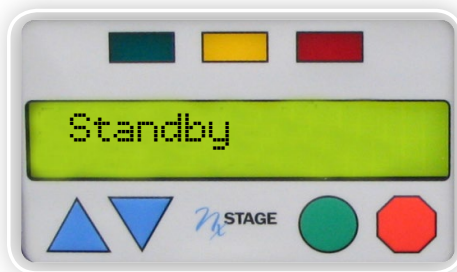


1. Connect the power interconnect cord from the cyclor to the AC power connector.
2. Connect the heater power cord to heater power connector.
3. Connect the cable labeled J2 from the cabinet to the dialysate tub connector.
4. Connect the cable labeled J1 from the UV light tray to the UV light connector.
5. Connect the USB cable to the USB connector and then connect the other end to the cyclor's Jewel Box or ConNxBox™.

Priming a PAK

Installing a new PAK

1. Turn on the PureFlow SL.
2. Check the control panel to make sure that the PureFlow SL is in STANDBY mode.
3. Turn on the cold water supply.
4. Place the PAK shipping box on its side so that the label faces up.
5. Open the box.
6. Pull the white handle to remove the PAK from the shipping box.
7. Remove the packages of control unit adapters from the side of the new PAK and set them aside.
8. Tear off the perforated section of the PAK.



Remove the perforated section from the PAK.

9. Slide the PAK over the lip and into the PAK compartment in the cabinet.



Slide the PAK into the compartment

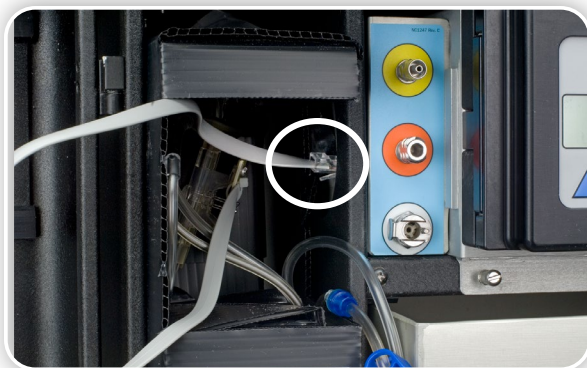
Connecting the water lines and electrical cable to the control unit

The control unit has connectors on the front that are used while making dialysate and during treatment.

The connectors are color-coded by function.

- The waste connector is yellow.
- The conductivity sensor connector is orange.
- The water outlet connector is white.

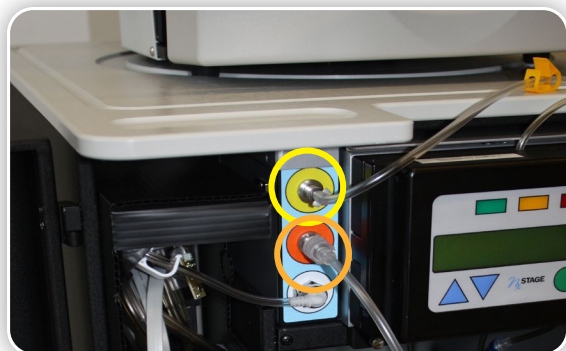
1. Remove the tape around the water inlet line with the white clamp and the gray electrical cable.
2. Gently pull the three lines from the PAK.
3. With the tab facing down, insert the electrical cable from the PAK into the electrical connector on the left side of the control unit.
4. Push in the connector until you hear a click.



5. Connect the PAK water inlet line with the white clamp to the white water outlet connector on the front of the control unit.
6. Push in the connector until you hear a click.
7. Connect the condo adapter line with the orange clamp to the orange conductivity sensor connector on the front of the control unit.



8. Connect the waste line adapter with the yellow clamp to the yellow waste line connector on the front of the control unit.
9. Connect the clear connector at the end of the PAK water outlet line with the blue clamp to the condo adapter line with the orange clamp.

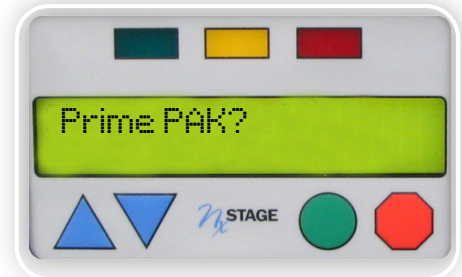


Note: The only time you make this blue to orange connection is when priming a PAK.

Priming a new PAK

You must use a primed PAK to make a batch of dialysate.

1. Check that all connections are tight and all clamps are open.
2. Make sure that the cold water supply is on.
3. Place the drain line in the drain.
4. If using LINX, make sure that the green center light on the LINX system is lit.
5. Press **GO** .
 - › The control unit shows the message “Prime PAK?”



6. Press **GO**  again.
 - › The PureFlow SL starts priming the PAK.
 - › Priming takes about 2.5 hours.
 - › The control unit shows the message “Prime PAK Complete” when priming is done.



7. Clamp both blue clamps on the PAK water outlet line.
8. Press **GO**  again to return to STANDBY mode.

Making a batch of dialysate

Loading the SAK

The SAK must be loaded into the tub so that when it is unfolded, the front and rear are at the same height. This ensures that the SAK fills evenly.

1. Make sure that the PureFlow SL is in STANDBY mode.
 - › Press **GO** .
2. The control panel shows the message “Open Door, Load SAK-XXX.”
3. Remove the SAK from the package.
4. Check for leaks and loose caps or connections.
5. Verify the following :
 - › The SAK type matches your prescription.
 - › The SAK type matches the SAK type shown on the control panel.
 - › The expiration date has not passed.



Note: SAK-40x series can only be used with PureFlow SL software version 1.15 or higher. Refer to “Changing the SAK type” on page 60 for instructions on changing the SAK type.

6. Open the cabinet door and pull out the tub.
7. Place the SAK into the tub with the label facing you.
8. Slide the SAK to the back wall of the tub.
9. Unfold the top fold so the label is against the back wall of the tub.
10. Unfold the front fold toward the front of the tub.
11. Remove and discard the protective foam sheet.
12. Gently push down on the SAK to make sure it is seated correctly.



Pull out the tub

Running the SAK lines

Before connecting the SAK lines, run them through the control panel and the dialysate pump cover.

1. Uncoil the lines.
2. Remove the tape.
3. Check that none of the lines are kinked or crossed.
4. Open the control panel door.
5. Lift up the dialysate pump cover.
6. Insert the five-way connector and the elbow joint into the retaining clips.
7. Run the lines through the channels above and below the connector.
8. Run the dialysate pump line through the dialysate pump.
 - › The dialysate pump line must point to the right.
9. Close the dialysate pump cover.
10. Make sure the lines are properly seated, then close the control panel door.



SAK 30x shown

Note: If using the SAK-40x series, route the pressure relief line around the left side of the closed control unit panel door.



SAK 40x shown

Adjusting the line collar assemblies

1. Locate the lines with the green line collar assemblies exiting from the SAK.
2. Pull the lines on each side of the green line collar assembly to release the fold.
3. Slide the green line collar assemblies over the previously folded areas on both lines.
 - › After two seconds, control panel shows the message "Connect Lines."

Connecting the SAK and PAK lines

1. Close the blue clamp on the PAK water outlet line and the orange clamp on the condo adapter line.
2. Disconnect the PAK water outlet line (blue clamp) from the condo adapter line (orange clamp).



Note: Whenever the condo adapter line is not connected to the PAK during PRIME mode or to the SAK during MAKE BATCH mode, make sure the orange clamp on the line is closed.

3. Disconnect the short line segment with the blue non-reopening clamp from the PAK water outlet line (blue clamp).
4. Remove the protective cap from the SAK water inlet line (blue clamp).
5. Connect the SAK water inlet line (blue clamp) to the PAK water outlet line (blue clamp).
6. Tighten the blue rotating collar.
7. Remove the connector tab on the SAK water inlet line (blue clamp).
8. Drape the SAK water inlet line into the tub.
9. Open the blue re-opening clamp on the PAK water outlet line.
10. Remove the cap from the SAK conductivity line (orange clamp).
11. Connect the SAK conductivity line (orange clamp) to the orange conductivity adapter on the front of the control unit.
12. Open the orange clamp on the condo adapter line.
13. Completely slide in the tub and close the cabinet door.

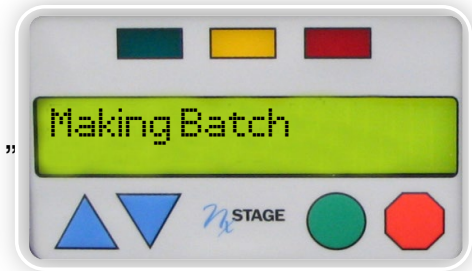


Note: Make sure that the lines do not get caught in the cabinet door and are not kinked.

Making a batch of dialysate

Once the SAK has been loaded and properly connected, the PureFlow SL is ready to make a batch.

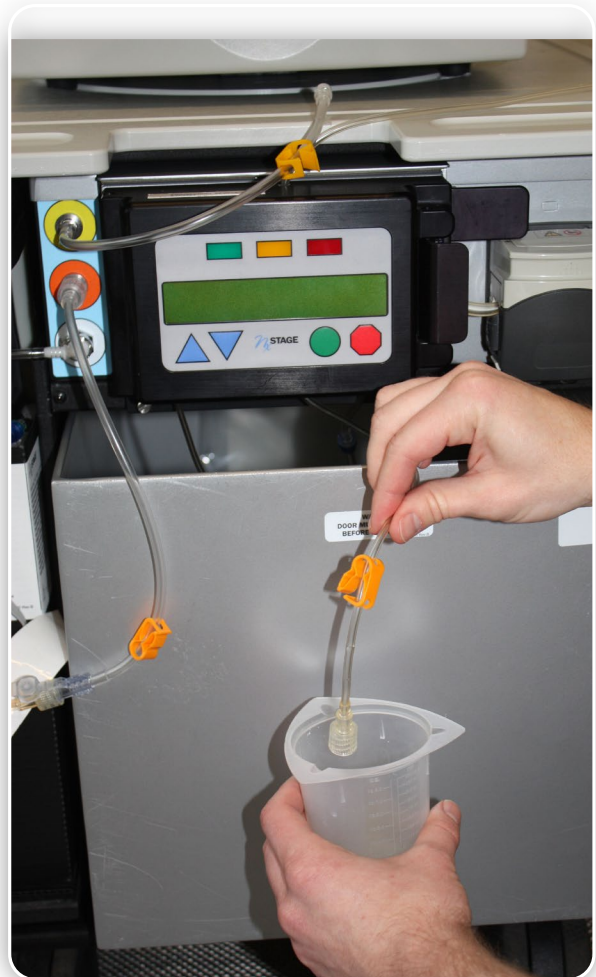
1. Turn the cold water on.
2. Press **GO**  to start the batch.
3. The control panel shows the message “Making Batch.”
 - › A batch takes 5–7 hours depending on the SAK size.



Testing for chloramines/chlorine

To test the batch for chloramines/chlorine, follow the instructions included with the test kit your facility uses. For the best results, test for chloramines within two hours of making a batch. Use test strips that can detect 0.1 parts per million chloramines/chlorine.

1. Turn the cold water on.
2. Check that the automated conductivity check was successful.
3. The control panel shows the message “Check Chloramines, Remove Orange Line.”
4. Close the orange clamp on the condo adapter line.
5. Disconnect the SAK conductivity line with the orange clamp from the condo adapter line.
6. Hold the SAK conductivity line over the test strip or specimen container.
7. Press **GO**  .
 - › The PureFlow SL dispenses the sample in approximately one minute.
 - › You will hear the valves open before the fluid sample begins dispensing.
 - › After the sample is dispensed, the control panel shows the message “Check Chloramines, Reconnect Line.”
 - › PureFlow SL software version 1.15 or greater dispenses a 100 mL sample.
 - › PureFlow SL software versions prior to 1.15 dispense a 60 mL fluid sample.



Collect the dialysate sample

- 8. Reconnect the SAK conductivity line to the condo adapter and then open the orange clamp.
- 9. Test chloramines using the test kit and instructions provided by your institution.
- 10. Press **GO** 
 - › The control panel shows the message “Check Chloramines, Pass: GO Fail: STOP.”

If the sample passes:	If the sample fails:
Press GO . The control panel shows the time remaining until the batch expires.	a. Press STOP . › The PureFlow SL prompts you to test again. b. Repeat the test procedure. › If the new sample passes, use the batch. However, if the new sample fails, the system automatically goes to DRAIN mode. › To perform a treatment, use dialysate bags or make a new batch.

Using a batch

Remember the following when using a batch:

- The batch must be used before it expires.
- The **Batch Expiration Time** is tracked by the control unit.
- The time tracking begins at the start of mixing the batch of dialysate.
- The drain line must be in a drain at all times.
- Use aseptic technique when handling the SAK and making cartridge connections.
- Always check chloramines before using a new batch.

Connecting to the cartridge

Connect the PureFlow SL to the cartridge after the cartridge has been primed.

1. Press **GO**  on the PureFlow SL.
 - › The control panel shows the message “Config to Use Batch.”
2. Press **GO**  again.
 - › The control panel shows the message “Batch in Use.”
3. Close the green clamp below the 1.2 micron filter on the SAK dialysate outlet line.
 - › Do NOT close the green non-reopening clamp on the dialysate outlet line.
4. On the cartridge, close the white clamp on the saline line and then close the green clamp on the dialysate inlet line.
5. Disconnect the cartridge saline line and the dialysate inlet line.
6. Close the white clamp on the saline “T” on the arterial blood line (red clamp).
7. Attach the saline line to the saline “T” (white to white). **Do not open the clamps.**
8. Remove the cap from an outlet of the SAK dialysate outlet line.
9. Connect the SAK dialysate outlet line to the cartridge dialysate inlet line (green to green).



Note: You must use a new dialysate outlet for each treatment.

10. Open the green clamps on both the SAK dialysate outlet line and the cartridge dialysate inlet line
11. Close the yellow clamp on the cartridge waste line and on the priming spike.
12. Disconnect the cartridge waste line from the priming spike and connect it to waste line adapter (yellow clamp) on the PureFlow SL.
13. Open the yellow clamps on the waste line and the waste line adapter.
 - › To start using the batch, press **GO**  on the PureFlow SL.
 - › To start a treatment, press **TREATMENT**  on the cycler.

Disconnecting from the cartridge

After the treatment is complete, do the following:

- 1. Press **STOP**  on the PureFlow SL to pause it.
- 2. Close the non-reopening green clamp on the used SAK dialysate outlet.
- 3. Close the green clamp on the cartridge dialysate inlet line.
- 4. Disconnect the cartridge dialysate inlet line from the dialysate outlet line (green clamps).
- 5. Close the yellow clamps on the cartridge waste line and the waste line adapter (yellow clamps).
- 6. Disconnect the cartridge waste line from the waste line adapter.
- 7. Connect the cartridge waste line to the priming spike to prevent leaks.

Keep the PureFlow SL in pause if:	Drain the batch if:
There is enough dialysate remaining for the next treatment.	■ There is not enough dialysate for the next treatment. ■ The batch expires before next treatment.

 **Note:** Do not turn off the PureFlow SL between treatments. The batch cools because the heater is off.



Discarding a batch

Once you start draining the SAK, you cannot return to using the batch.

Draining the batch

1. Press and hold **STOP** .
 - › The control panel shows the message
“Batch in Use Cont: Go To Drain: STOP.”
2. Press **STOP** .
 - › The control panel shows the message “Drain Pending.”
3. Press **GO**  to start draining the batch.
 - › Once draining is complete, the control panel shows the message
“Drain Complete, More: GO Done: STOP.”

If you are draining a partial batch

The PureFlow SL assumes you are draining a full 60 L batch, which takes 3.5 hours. Depending on the amount of fluid left to drain, you may stop the drain mode before the control panel shows the message “Drain Complete.”

1. Press **STOP**  to pause the drain.
2. Press and hold **STOP**  to end the drain.

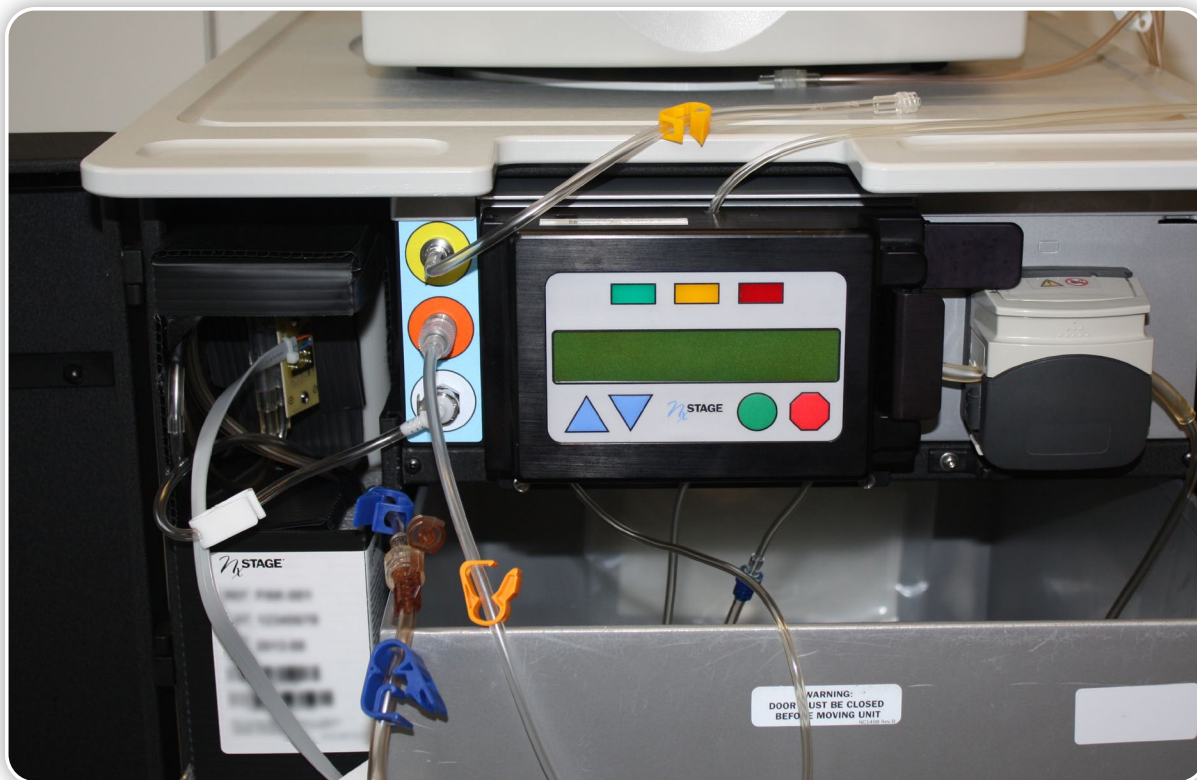
Performing final flush

1. Turn the cold water on.
2. Press **STOP** .
 - › The control panel shows the message “Drain Flushing”.

Unloading the SAK

After the final flush completes, the PureFlow SL enters UNLOAD mode.

- › The control panel shows the message “Unload, Close Blue Clamps”.
1. Close the three blue clamps on the water lines that connect the PAK to the SAK, including the non-reopening blue clamp.
 2. Disconnect the SAK water inlet line (blue clamp) from the PAK water outlet line (blue clamp), leaving the short line segment on the PAK line as a cap to prevent contamination.
 3. Close the orange clamp on the conductivity sensor line on the condo adapter and then disconnect the line.
 4. Press **GO** .
 - › The control panel shows the message “Unload, Open Door; Remove SAK”.
 5. Open the control panel door and then the dialysate pump cover.
 6. Remove the lines from the dialysate pump and the control panel channels.
 7. Close the dialysate pump cover
 8. Close the control panel door.
 - › The PureFlow SL returns to STANDBY mode and is ready to make a new batch.
 9. Remove and discard the SAK.



Open the tub to remove the SAK.

Maintenance

Although maintenance requirements are minimal, clean and disinfect the exterior surfaces after each treatment.

 **Note:** Remember to use universal precautions (as defined by your center) when cleaning dialysis equipment.

Cleaning the PureFlow SL

1. Disconnect the equipment from its power source.
2. Make sure all disposables are removed from the equipment.
3. Open the PureFlow SL cabinet and pull out the tub.
4. Use a paper towel and mild detergent (such as a dishwashing liquid) to clean all exterior surfaces. Following the detergent manufacturer's cleaning instructions.

 **Note:** Avoid touching the metal connections on the back of the PureFlow SL when cleaning. Do not pour solution onto or allow fluid to drip into the equipment.

5. Throw away used cleaning supplies and personal protective equipment appropriately.
6. For storage, make sure cabinet door is closed.

Disinfecting the PureFlow SL

If the equipment is contaminated with blood or suspected of being contaminated with pathogenic microorganisms (bacteria, virus, or fungi), disinfect it using a bleach solution.

Refer to “Maintaining the cyclor” on page 22 for additional information.

1. Prepare a bleach solution according to the table below.

Sodium hypochlorite concentration	Water-to-bleach solution
5.0% - 5.9%	Add 16 oz water and 2 oz household bleach
6.0% - 6.9%	Add 20 oz water and 2 oz household bleach
7.0% - 7.9%	Add 24 oz water and 2 oz household bleach
8.0% - 8.9%	Add 28 oz water and 2 oz household bleach



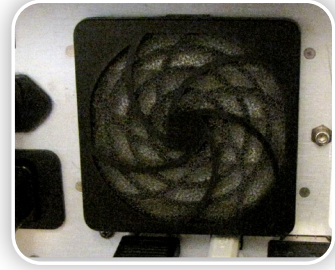
Note: Most common household bleaches have a concentration of 5.25% - 6.15% sodium hypochlorite. Refer to the product label for the actual strength of the product.

2. Moisten a soft cloth with the bleach solution.
3. Clean all visible blood or contamination.
4. Use a clean cloth to apply the bleach solution.
5. Allow the solution to remain in contact with the exterior surface for 10 minutes.
6. Use a new soft cloth and water to rinse off the bleach solution.
7. Allow the surface to air dry.



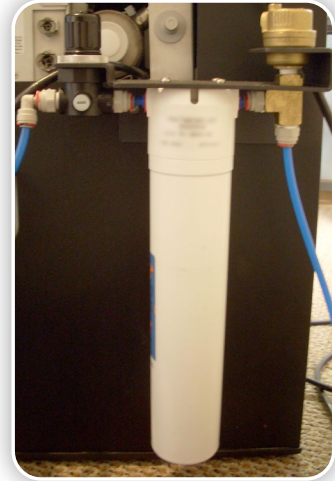
Maintaining the air filter

- Clean or replace the PureFlow SL's air filter every three months.
- Follow the instructions in the *PureFlow SL User Guide*.



Replacing the sediment filter

- Replace the sediment filter annually or more frequently as needed.
- Follow the instructions in the *PureFlow SL User Guide*.
- Write the installation date on the sediment filter as a reminder.



Flushing the drain line

Flush the drain line monthly or more frequently as needed. If using the drain line cleaning kit provided by NxStage, refer to the package instructions for use.

Do the following while the PureFlow SL is in STANDBY mode or as part of the recovery from an alarm:

1. Fill a 60 mL syringe (or two 30 mL syringes) with a 1:10 bleach solution.
2. Attach a recirculation connector (female-female adapter) to the syringe.
3. Connect the recirculation connector that is attached to the syringe to the Waste Line Adapter.
4. Unclamp the yellow clamp on the Waste Line Adapter.
5. Push 60 ml of the bleach solution into the Waste Line Adapter.
6. Reset the drain line by disconnecting and then reconnecting the quick disconnect for the black drain line at the rear of the control unit.
7. Allow the solution to stay in the waste line for 5-10 minutes.
8. Fill a 60 ml syringe (or two 30 ml syringes) with 60 ml of tap water.
9. Connect the recirculation connector that is attached to the syringe to the Waste Line Adapter.
10. Push the tap water into the Waste Line Adapter.
11. Repeat the rinse with an additional 60 mL of tap water.

Collecting water and dialysate samples

All water samples must be properly stored, packaged, and shipped according to the testing lab's instructions.

Both source water and product water must be tested as follows:

- **Source water:** Send a source water sample for testing before use begins to determine if the PureFlow SL can be used and if the LINX system should be used as well, if available in your region.
- **Product water:** Test product water when the PureFlow SL is installed and produces the first batch. Repeat as per centre's guidelines.

When should the product water be tested?

- **Initial test:** Obtain this sample within four hours after making the first batch. Take the sample when the chloramines test has passed and "Batch Use: GO" is shown on the control unit.
- **Annual test:** Collect this sample near the end of PAK life, preferably after the Caution 5, "Last Batch Caution" is shown on the control unit.

Collecting a product water sample



Note: Remember to follow aseptic technique.

1. Prepare the following supplies:

- | | |
|---------------------------------|-------------------------|
| › Sterile female-female adapter | › Sterile 30 mL syringe |
| › Gloves | › Testing container |
| › Clean drape | › Alcohol prep pad |

Sterile female-female adapter



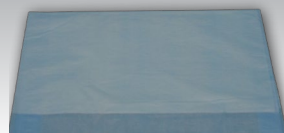
Gloves



Sterile 30 mL syringe



Clean drape



Testing container

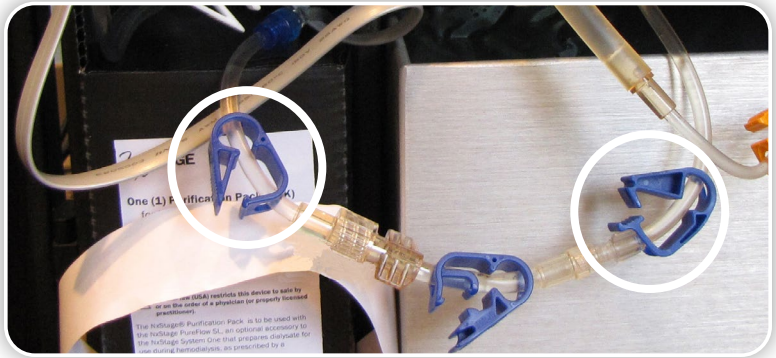


Alcohol prep



2. Connect a sterile female-female adapter to a sterile 30 mL syringe.

3. Close the two blue clamps on either side of the blue non-reopening clamp on the water line connecting the PAK to the SAK.
4. Disconnect the SAK inlet line from the PAK, leaving the short line segment with the blue non-reopening clamp on the PAK water outlet line.
5. If you plan to make a batch after obtaining the sample, place the SAK water inlet into an opened alcohol prep pad.
6. Attach the open end of the sterile female-female adapter to the disconnected PAK water outlet line.
7. Open the blue reopening clamp on the PAK water outlet line and pull back on the syringe to obtain a 30 mL product water sample from PAK.
8. Close the blue reopening clamp on the PAK water outlet line to the left of the blue non-reopening clamp.
9. Disconnect the syringe and inject the product water sample into the appropriate specimen container supplied by your center.
10. Repeat steps 2 - 9 as needed to collect the required volume of product water.
11. Disconnect the syringe and set it aside.
12. Reconnect the SAK water inlet line to the PAK water outlet line (blue to blue connection).
13. To use the batch for a treatment, follow the instruction for "Using a batch" on page 49.



Collect the product water sample

Collecting a dialysate sample

Collect a dialysate sample near or at the end of SAK life. Remember to do the following:

- Follow strict aseptic technique to prevent sample contamination.
- Follow your testing lab's procedures for storage, packaging, and shipping specimens.
- Collect the sample when you still have at least one unused dialysate outlet line. The dialysate sample will be taken from an unused dialysate outlet line.

1. Prepare the following supplies:

- › Gloves
- › Clean drape
- › Mask
- › Alcohol prep pad
- › Dialysate testing kit or sterile specimen container



Gloves



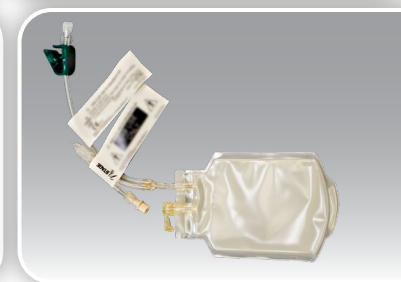
Clean drape



Mask



Alcohol prep



Dialysate Testing Kit (DTK-001) or Sterile Specimen Container

2. Check that your PureFlow SL has been paused.
 - › The control panel shows the message: "Batch in Use: Paused."
3. Press **GO**  on the PureFlow SL.
 - › The control panel shows the message: "Batch in Use: Batch Expires: hh:mm"
4. Close the green clamp on the dialysate outlet line of the SAK below the 1.2 micron filter.
5. Put the mask on, wash your hands, and put on gloves.



Note: Everyone else in the room must also wear a mask.

6. Prepare a clean field using a disposable drape.

If using the DTK-001:	If using a sterile specimen container:
- Remove the cap from the DTK-001 line with the green non-reopening clamp. - Connect the line to the unused connection on the dialysate outlet line.	Open the container and place the lid sterile side up on the clean drape.

- Open an alcohol swab package.
- Carefully remove the protective cap on the remaining unused dialysate outlet line and put the cap (clean side first) inside the alcohol swab package.
- Open the dialysate outlet line below the 1.2 micron filter and allow the required volume of dialysate to pump into the DTK-001 sample bag or specimen container.
- When you've collected the required volume of dialysate, close the clamp on the dialysate outlet line before the 1.2 micron filter.
- Close the green non-reopening clamp on the DTK-001 line.
- Disconnect the DTK-001 line from the dialysate outlet line.
- Remove the protective cap that was stored in the alcohol swab package and place it on the end of the dialysate outlet line.
- Immediately prepare the dialysate sample for shipment following the guidelines of your testing laboratory.

Supplemental procedures

Adjusting the heater setting

1. Press the **UP**  or **DOWN**  arrow on the control panel to go to the heater setting.
 - › The control panel shows the message: "Heater Setting: Current Setting Value"
2. Press the **UP**  or **DOWN**  arrow to adjust the heater setting from **0** to **20**.
 - › If you select **0**, the heater is turned off.
3. Press **GO**  or wait three seconds to return to the previous display.
 - › The heater does not turn on until there is enough fluid in the SAK.

Changing the SAK type

To change the SAK type, the PureFlow SL must be in STANDBY mode.

1. Press and hold **STOP**  to go to STANDBY mode.
2. Press and hold the **DOWN**  arrow to go to USER MAINTENANCE mode.
3. Press **GO**  to enter **Settings**.
4. Press **GO**  to enter **Change SAK Type**.
5. Press the **UP**  or **DOWN**  arrows to select the SAK type.
6. Press **GO**  to confirm the SAK type.
7. Press and hold **STOP**  until the PureFlow SL starts the self-test.
 - › After the self test is completed, the PureFlow SL returns to STANDBY mode.

Pausing the PureFlow SL

1. Press **STOP** .
 - › To resume, press **GO** .
 - › If you are resuming using a batch, press **GO**  again.

Draining the PureFlow SL

1. Press **STOP**  to pause.
2. Press and hold **STOP**  until the display shows "BATCH Cont: GO To Drain: STOP".
3. Press **STOP**  to enter DRAIN mode.
4. Press **GO**  to begin draining the SAK.

Removing the PAK

1. Open the cabinet door on the front of the PureFlow SL.
2. Close the white clamp on the water inlet line.
3. Close the blue re-opening clamps on the water outlet line.

 **Note:** Do not close the blue non-reopening clamp.

4. Disconnect all PAK fluid connections from the front of the control unit, conductivity sensor adapter, and the SAK.

 **Note:** Depress the metal tab on the left side of the water inlet line to remove it.

5. Disconnect the PAK electrical connector from the side of the control unit.

 **Note:** Press in the small, plastic tab at the bottom of the connector to release it.

6. Lift up the front end of the PAK so that it clears the lip at the front of the compartment, and then slide out the rest of the PAK.

Draining the SAK manually

If the PureFlow SL does not drain automatically, manually drain the SAK using one of the following methods.

Drain the SAK from the user maintenance menu:	Manually drain the SAK:
a. Press and hold STOP  to go to STANDBY mode. b. Press and hold the DOWN  arrow to enter User Maintenance Settings. c. Press the DOWN  arrow to select "User Maintenance Drain." d. Press GO  to drain.	▪ Refer to the <i>PureFlow SL User Guide</i>.

Removing the control unit

1. Press and hold **STOP**  to go to STANDBY mode.
2. Shut off the power.
3. Disconnect the power cord.
4. Close the clamps on all the fluid lines.
5. Disconnect all the connections from the front and the back of the control unit.
6. Disconnect the PAK's electrical connector from the side of the control unit.
7. Loosen the two thumb screws located under the control unit.
8. Slide the control unit forward to remove it.

Replacing the LINX DI Cells

1. Put the LINX in BYPASS mode.
2. Position the tip of the blue unit connector over a drain or a bucket.
3. Press down on the tip of the unit connector to release a short burst of air and water to depressurize the system.
4. Remove one blue DI cell cover and set it aside.
5. Securely attach the wrench from the DI Cell Replacement Kit to the DI cell.
6. Turn the wrench left for two turns.
7. Slowly lift the DI cell from the LINX and set it aside.
8. Use the pipette from the replacement kit to remove the water from the empty cell housing.
9. Remove the DI cell top and install it on the new DI cell securely.
10. Place the new DI cell into the empty cell housing.
11. Turn the DI cell to the right to hand-tighten.
12. Use the wrench to turn the DI cell to the right until the top aligns with the seam on the LINX unit.
13. Replace the blue DI cell cover.
14. Turn to the blue DI cell cover left until it is tight to the housing.
15. To replace the second LINX DI cell, repeat the above steps 4 through 14.

Notes:



Chapter 4: How do I troubleshoot common alarms?

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Types of red alarms and yellow cautions

The alarms in this quick reference guide are the most common cyclor alarms. Only the top three or four most common causes and operator actions are included. Refer to the *User Guides* for a complete listing of all the alarms and cautions, and all the causes and operator actions.

Numbers	Type of Condition	User Response
000	Change of status	Press STOP  to continue when appropriate.
1 – 9	Information only	Some actions may be required.
10 – 14	Air	Remove air to continue.
20 – 34	Pressure	Check the blood and/or fluid lines for closed clamps, occlusions, disconnections, clotting, and/or access flow problems
35 – 39	Balancing system	Check the fluid circuit to ensure balance.
40 – 41	Power failure	Restore power or discontinue, as appropriate.
50 – 52	Temperature	Allow dialysate fluid to cool.
53		Fluid temperature is below 33.3 °C.
54		Low temperature monitor is disabled.
60 – 61	Blood leak	Check the effluent for blood.
62		Check the circuit or dialyzer for possible clotting.
70 – 71	Maintenance	Cartridge life or cyclor maintenance interval is exceeded.
80 – 93	Startup/priming	Notification of intervention needed in priming and alarms test.
>99	System	Notification of system, communication, or setup error.

Yellow Caution	Caution Trigger
2	The system is conducting a normal automated fluid balancing system check, which takes about two minutes.
3	A setting is too low or too high.
4	The blood pump is stopped.
7	Some alarms are temporarily overridden.
8	Pressure limits are not locked after a flow rate change.
9	Pressure-related alarm recovery.
12	Air recovery following a red air alarm.
14	Therapy fluid (dialysate) air

Common cycler alarms and cautions at a glance

The alarms in this quick reference guide are the most common cycler and PureFlow SL alarms. Only the top three or four most common causes and operator actions are included. Refer to the user guides for a complete listing of all the alarms and cautions, and all the causes and operator actions.

Caution/Alarm Number	Caution/Alarm Name	Probable Causes
 Alarm 10	Check for Venous Air during TREATMENT	▪ Air that wasn't completely removed from the dialyzer venous header. ▪ Air is in the blood circuit or patient blood lines because they weren't snapped and tapped. ▪ Loose arterial connections.
 Alarm 11	Check for Arterial Air during TREATMENT	▪ Poor flow through the arterial access site. ▪ The needle changed position. ▪ Loose, disconnected, or clamped arterial blood line. ▪ Air in saline line because the saline bag is empty.
 Caution 14	Check Fluid Line Inlet: Air Detected in Fluid Line Inlet	▪ The dialysate source fluid volume is low or the bag is empty. ▪ Blocked, kinked, or clamped dialysate line(s). ▪ Loose dialysate line connections.
 Alarm 20	Check Blood Circuit: Venous Pressure Low	▪ The blood flow rate is lower than the prescribed rate. ▪ A venous needle is dislodged. ▪ A manual fluid bolus was delivered. ▪ The venous blood line is disconnected.

Caution/Alarm Number	Caution/Alarm Name	Probable Causes
 Alarm 24	Check Arterial Access: Access Pressure at Low Limit	▪ The arterial access flow problem. ▪ The arterial blood line is kinked or clamped.
 Caution 25	Access Pressure Pod Error: Reset Access Pressure Pod	▪ The access pressure pod monitoring line is disconnected or poorly connected. ▪ The access pressure pod monitoring line is kinked.
 Alarm 30	Check Blood Circuit: Venous Pressure High During TREATMENT	▪ The blood flow rate too high for the vascular access. ▪ The venous blood line is kinked or clamped. ▪ Infiltration in the venous access.
 Alarm 35	Check Waste Line: Waste Line Pressure High	▪ The waste or drain line is kinked, clamped, pinched, blocked, submerged, or not connected ▪ The PureFlow SL drain line is clogged.
 Alarm 37, 38, 39	Check Fluid Circuit: High Balance Chamber Pressure During TREATMENT	▪ Blocked, kinked, or clamped fluid line(s). ▪ Empty or low dialysate source. ▪ If using PureFlow SL, one of the following has happened: › TREATMENT  was pressed on the cyclor before GO  was pressed on the PureFlow SL. › There is insufficient volume in the SAK. › The drain line is clogged.

Common PureFlow alarms and cautions at a glance

Caution/Alarm Number	Caution/Alarm Name	Probable Causes
 Alarm 12	PAK Exhausted	The PAK is no longer usable.
 Alarm 43	Conductivity Test Failed	- Incorrectly set SAK type. - Kinked green line collar assemblies on the SAK lines. - The drain line not properly connected. - The drain line is blocked.
 Alarm 44	No Flow Detected Through Conductivity Line	No flow through the conductivity line due to a closed clamp, kinked, pinched, disconnected, or improperly connected line.
 Alarm 50	Inlet Pressure Low	- Low source water pressure. - Water is not turned on. - The water inlet line (blue line from source water to PureFlow SL) is kinked or improperly connected.
 Alarm 51	Output Pressure High	- A SAK line clamp is closed, or the line is kinked, or improperly connected. - The SAK is not loaded correctly.
 Alarm 52	Fluid Leak in Control Unit	Fluid leak in the control unit.
 Alarm 53	Fluid Leak in Tub	Loose connections that are causing a leak.
 Alarm 54	Fluid Leak in PAK	Fluid leak in the PAK.

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

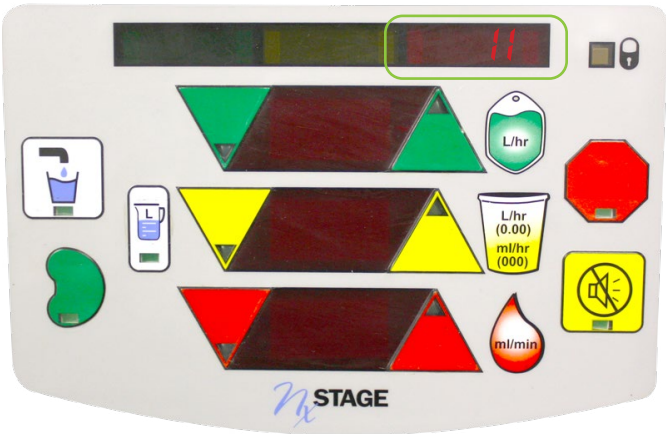
Standard response for cyclor alarms and cautions

There are standard actions to take when responding to cyclor cautions and alarms.

Note: Always be sure that the green operating window information returns after resolving an alarm or caution.

Standard response to cyclor alarms

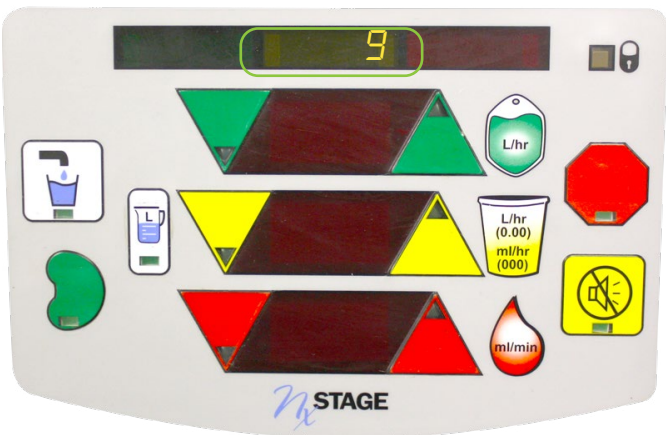
1. Locate the alarm number in the red alarm window.
2. Press **MUTE**  to silence the alarm.
3. Identify the cause and fix it.
4. Press **STOP**  on the cyclor.
5. Press **TREATMENT**  if in TREATMENT mode; press **ADD FLUID**  if in PRIME or RINSEBACK mode.
6. If unable to resolve an alarm after several attempts, do one of the following:



For balance chamber alarms (Red alarms 35, 37, 38, 39)	For all other alarms:
1. Press and hold STOP . > The blood pump starts to run at the treatment rate. 2. When you resolve the cause, press TREATMENT  to resume the treatment.	If you cannot resolve the cause: ▪ Press STOP  to end the treatment and begin rinseback.

Standard response to cyclor cautions

1. Locate the caution number in the yellow caution window.
2. Identify the cause and fix it.
3. Press **TREATMENT**  if in TREATMENT mode; press **ADD FLUID**  if in PRIME or RINSEBACK mode for cautions that require action.
4. Press **MUTE**  to silence cautions that only provide information.



Responding to cyclor air alarms and cautions during TREATMENT mode

Caution 4: Blood Pump Off Caution

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for

STOP  was pressed during treatment and the blood pump stopped.
The blood flow rate is zero (0).

Do

1. If you are using an external infusion pump, turn it off.
2. Press **TREATMENT**  to continue the treatment
 - › If you are using an external infusion pump, turn it on.
3. Press **ADD FLUID**  to continue to RINSEBACK mode.



Note: The risk of clotting increases when the blood pump is stopped for a long time.

Alarm 10: Check for Venous Air During TREATMENT

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for

Do

Air that wasn't completely removed from venous header.

Remove air from the venous header.

Air in the blood circuit or in the blood lines because they weren't snapped and tapped correctly.

Remove air from the venous lines.

Loose arterial connections.

Tighten and secure the connections.

3. Press **STOP**  on the cyclor.
4. Attach a 20 mL luer lock syringe to the post-dialyzer port.
5. Open the blue clamp on the port and slowly pull back on the luer lock syringe to remove air.
6. Hold the syringe upright to allow the air bubbles to rise.
7. Inject the blood back through the post-dialyzer port.
8. Close the blue clamp on the port securely.
9. Press **TREATMENT**  on the cyclor.
 - › The cyclor displays Yellow Caution 12.
10. Watch the blood as it returns to the patient, looking for any air in the venous blood line (blue clamp).
 - › The blood pump runs slowly to allow you to observe for air.



If air is seen in the venous blood line:

- a. Press **STOP**  on the cyclor.
- b. Repeat steps 4 through 9
- c. If you cannot remove air from the venous patient line, press **STOP**  and end the treatment.
- d. Do not rinse back blood if you see air in the patient blood lines.

If no air is seen:

- a. Press **TREATMENT**  to return the blood pump to the programmed rate.
- b. Flush the post-dialyzer port with 3 mL of saline.
- c. Close the blue clamp on the port securely.

Alarm 11: Check for Arterial Air During TREATMENT

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for	Do
Poor flow through arterial access flow site.	Re-establish or adjust the access.
Change in needle position.	Reposition the needle.
The arterial blood line is loose, disconnected, or a clamp is closed.	Tighten, reconnect, or open the clamp on the arterial blood line.
Air in saline line because the saline bag is empty.	Replace the empty saline bag with a new bag.

3. Press **STOP**  on the cyclor.
4. Press **TREATMENT**  on the cyclor.
 - › The blood pump runs slowly.
 - › Continue to watch the arterial patient blood line (red clamp) and the venous header of the dialyzer for air.
5. Attach a 20 mL luer lock syringe to the post-dialyzer port.
6. Press **TREATMENT**  on the cyclor.
 - › The blood pump returns to the prescribed blood flow rate.
7. If you see air in the venous header, open the blue clamp on the port.
8. Slowly pull back on the luer lock syringe to remove the air.
9. Hold the syringe upright to allow the air bubbles to rise.
10. Inject the blood back through the post-dialyzer port.
11. Close the blue clamp on the port securely.
12. Flush the post dialyzer port with 3 mL of saline.
13. Close the blue clamp on the port securely.
14. Continue to check the venous header for air and remove air as needed.



Note: If this alarm occurs again, lower the blood flow rate, as the arterial access may not be able to deliver the set blood flow

Caution 14: Check Fluid Line Inlet, Air Detected in Fluid Line Inlet

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for	Do
A low fluid volume or empty dialysate source.	Add more dialysate.
The dialysate line is blocked, kinked, or a clamp is closed.	Clear, unkink or open the clamps on the line(s).
Loose dialysate line connections.	Tighten or secure the connections.

3. Press **TREATMENT**  on the cyclor.

Monitoring pressure alarms

It is important to monitor abnormal arterial and venous pressures to address access flow issues and prevent alarms.

Alarm 20: Check Blood Circuit, Venous Pressure Low

- 1. Press **MUTE**  to silence the alarm.
- 2. Identify and fix the probable cause(s).

Check for	Do
A blood flow rate that is lower than the prescribed rate.	Increase the blood pump rate.
A dislodged venous needle.	Secure the venous blood line or access.
A manual fluid bolus was delivered.	Resume prescribed blood flow.
A disconnected venous blood line.	Reconnect the venous blood line.

- 3. Press **STOP**  on the cyclor.
- 4. Press **TREATMENT**  on the cyclor.

Alarm 24: Check Arterial Access, Access Pressure at Low Limit

- 1. Press **MUTE**  to silence the alarm.
- 2. Identify and fix the probable cause(s).

Check for	Do
Arterial access flow problem.	Reposition the access, adjust the needle, or reduce the blood flow.
A clamp is closed on the arterial blood line or the line is kinked.	Open the clamp on the line or unkink the line.

- 3. Press **STOP**  on the cyclor.
- 4. Press **TREATMENT**  on the cyclor.

Caution 25: Access Pressure Pod Error, Reset Access Pressure Pod

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for

Disconnected or poorly connected access pressure pod monitoring line.

Kinked access pressure pod monitoring line.

Do

Follow steps 3-10 to reset the access pressure pod.

Unkink the monitoring line on the access pressure pod.

3. Detach the access pressure pod monitoring line from the cyclor.
 - › The access pressure pod deflates.
4. Press **STOP**  on the cyclor.
 - › If the pod fills immediately, skip to step 9.
 - › If the pod does not fill immediately, go to step 5.
5. Close the red clamp on the arterial blood line.
6. Open the white clamps on the saline line and saline "T."
7. When the pod diaphragm fills with blood, close the white clamps.
8. Open the red clamp on the arterial blood line.
9. Attach the access pressure pod monitoring line to the cyclor.
10. Press **TREATMENT**  on the cyclor.
11. Confirm that arterial pressures are within range.

Alarm 30: Check Blood Circuit, Venous Pressure High During TREATMENT

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for

The blood flow rate is too high.

The venous blood line is kinked or clamped.

Venous access infiltration.

Do

Decrease the blood flow rate.

Unkink or open the clamps on the line.

Correct infiltration.

3. Press **STOP**  on the cyclor.
4. Press **TREATMENT**  on the cyclor.

Alarm 35: Check Waste Line, Waste Line Pressure High

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for:

The waste or drain line is kinked, pinched, blocked, submerged, or not connected.

A clamp is closed on the waste or drain line,

Clogged PureFlow SL drain line.

Do

Correct the lines to ensure that the waste fluid is flowing freely.

Open the clamp.

Switch to disposable waste line extension.

3. Press **STOP**  on the cyclor.
4. Press **TREATMENT**  on the cyclor.
5. If unable to resolve an alarm after several attempts, follow the instructions "For balance chamber alarms (Red alarms 35, 37, 38, 39)" on page 70.

Alarm 37, 38, 39: Check Fluid Circuit, High Balance Chamber Pressure During TREATMENT

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).

Check for	Do
A clamp is closed on the dialysate or waste line.	Open the clamps.
The dialysate or waste lines are blocked or kinked.	Clear or unkink the lines.
Empty or low dialysate source.	Add more dialysate.
If using the PureFlow SL, TREATMENT  was pressed on the cyclor before GO  was pressed on the PureFlow SL.	Verify that the PureFlow SL is in "Batch in Use". If not, do the following: a. Press GO  twice on the PureFlow SL. b. Press TREATMENT  on the cyclor.
Insufficient SAK volume when using the PureFlow SL.	End the treatment, rinse back the blood, following your centre's instruction.
Clogged PureFlow SL drain line.	Switch to the disposable waste line extension.

3. Press **STOP**  on the cyclor.
 - › The number **9** appears in the yellow caution window.
 - › Do not press **STOP**  again.
4. Press **TREATMENT**  on the cyclor.
 - › The treatment automatically resumes when the Yellow Caution 9 disappears.
5. If unable to resolve an alarm after several attempts, follow the instructions "For balance chamber alarms (Red alarms 35, 37, 38, 39)" on page 70.

Special conditions

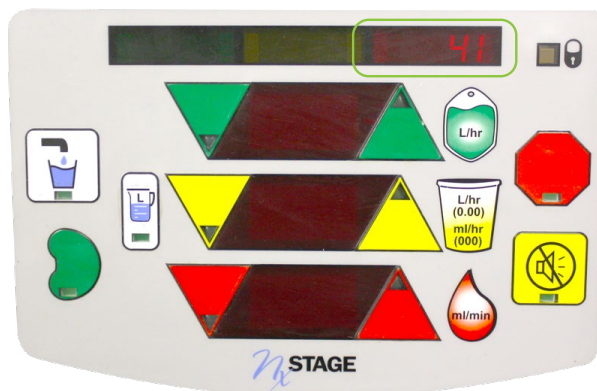
Caution 40: Perform Power Recovery: Power Failure

- 1. Press **MUTE**  to silence the alarm.
- 2. Identify and fix the probable cause(s).

Check for	Do
During the recirculation step of prime mode (000 in red alarm window, 23.0 in the top window): › Power is restored following a power failure or › Cyclер being turned off during recirculation and the cartridge life has not expired.	a. Press TREATMENT . b. Monitor the cyclер screen (20.0 to 23.0 in top window) indicating the system is rechecking the fluid balance system. c. When the number 23.0 appears, continue with the snap and tap procedure to remove air.
During treatment or rinseback mode: Power is restored following a power failure or cyclер being turned off for less than the preset number of minutes allowed.	In TREATMENT mode, press TREATMENT  to resume. In RINSEBACK mode, press ADD FLUID  to resume.

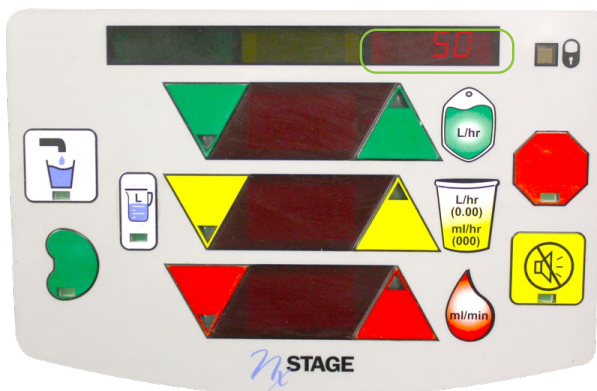
Alarm 41: Failed Power Recovery

1. Press **MUTE**  to silence the alarm.
2. End the treatment. Do not rinse back the blood. For instructions, see “Ending treatment without returning your blood” on page 24.



Alarm 50: Check Fluid Temp, Fluid Temp High

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).



Check for

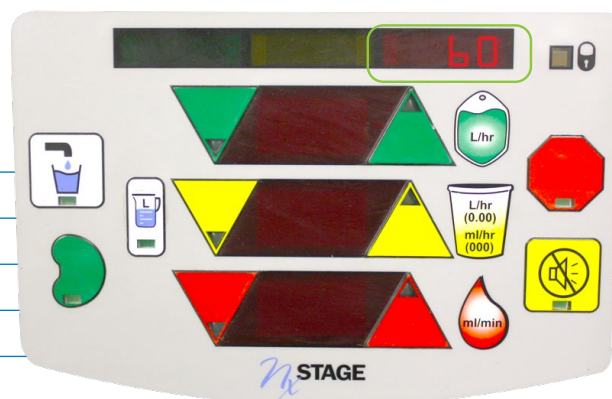
Do

The warmer or heater setting is too high.	Reduce the heater setting.
Dialysate bags that are too warm prior to set-up.	Cool or replace the dialysate bags.
Treatment environment that is too warm.	Cool the room.

3. Press **STOP**  on the cyclor.
4. Press **TREATMENT**  on the cyclor.

Alarm 60: Check for Blood Leak, Blood Detected in Waste Line

1. Press **MUTE**  to silence the alarm.
2. Identify and fix the probable cause(s).
Follow your centre's instructions for testing waste fluid for the presence of blood :



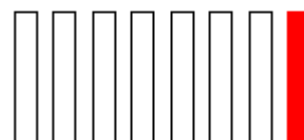
Responding to warmer alarms

Standard response to an Express Fluid Warmer alarm

The following occurs during an alarm :

- All the comfort setting lights turn red.
- An alarm tone sounds.
- The heater is disabled.

1. Press either the **UP**  or **DOWN**  arrow to display the alarm code.
 - › The alarm code displays for ten seconds.
 - › The alarm code is determined by which comfort setting lights remain red.
2. Use the *Express Fluid Warmer User Guide* to identify the probable cause(s) and fix it.
3. Press the **UP**  arrow to return to the treatment.
4. High fluid temperature could also cause an Alarm 50: Cycler High Fluid Temperature.



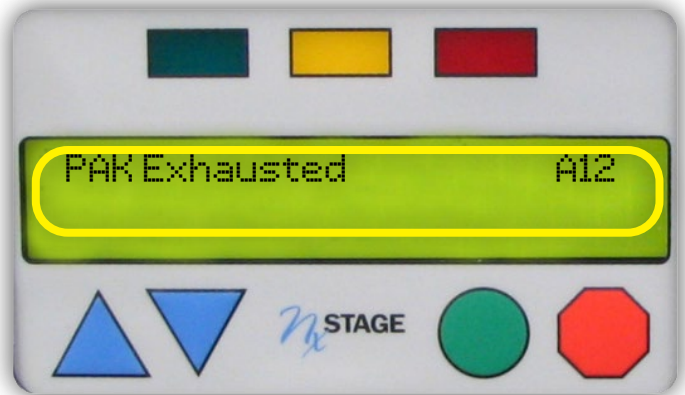
Responding to PureFlow SL alarms and cautions

Standard Response for PureFlow SL alarms and cautions

There are standard actions to take when responding to PureFlow SL alarms and cautions.

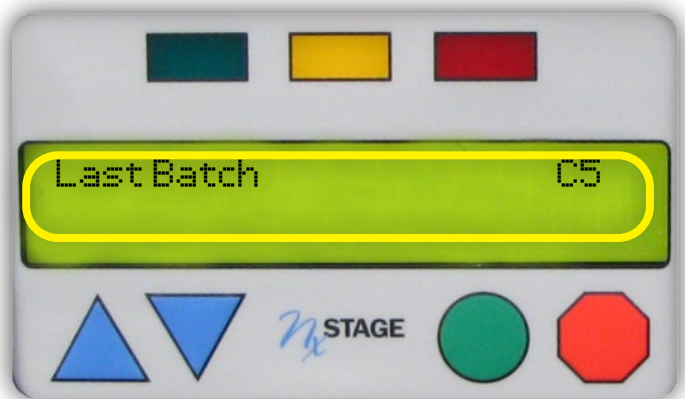
Standard Response to PureFlow SL alarms

1. See the red alarm light flashing and the alarm number and error message.
2. Press **STOP** .
3. Identify the cause and fix it.
4. Press **GO** .



Standard Response to PureFlow SL cautions

1. See the yellow caution light flashing and the error message.
2. Identify the cause and fix it.
3. Press **GO** .



Responding to PureFlow SL alarms during PAK PRIME

Alarm 12: PAK Exhausted, PAK is Exhausted and Cannot Be Used

- 1. Press **STOP** .
- 2. Press **GO** .
- 3. Install and prime new PAK.

Alarm 50: Inlet Pressure Low

- 1. Press **STOP** .
- 2. Identify and fix the probable cause(s).

Check for	Do
Low source water pressure or the water is not turned on.	Verify PureFlow SL is correctly connected to water source. Make sure water is turned on.
The water inlet line (blue line from source water to PureFlow SL) is kinked or not properly connected.	Unkink or connect line.

- 3. Press **GO** .
- 4. If the problem continues, call NxStage Customer Service to order a replacement sediment filter.

Alarm 51: Output Pressure High

1. Press **STOP** .
2. Identify and fix the probable cause(s).

Check for	Do
A line that is kinked, improperly connected, or has a closed clamp.	1. Check all lines and look for kinks and closed clamps. Ensure that the following is true: ▪ The PAK water inlet (white elbow) is connected to white connector on the control unit. ▪ PAK outlet line (blue clamp) is connected to the conductivity connector (orange) on the control unit. ▪ All PAK clamps are opened. 2. Disconnect and reconnect the drain line.

3. Press **GO** .
4. If the alarm continues, contact NxStage Technical Support.

Alarm 54: Fluid Leak in PAK

1. Press **STOP** .
2. Press **GO** .
3. If the alarm continues:
 - › Remove the PAK.
 - › Dry the PAK leak sensor.
 - › Dry the bottom of the PAK.
 - › Reinstall the PAK.
4. If the alarm continues, call NxStage Technical Support.

Responding to PureFlow SL alarms when making a batch

Alarm 43: Conductivity Test Failed

1. Press **STOP** .
2. Check the lines for closed clamps and kinks; open any closed clamps and correct any kinked lines.

Check for	Do
Incorrectly set SAK type.	Discontinue using the PureFlow SL and use bagged dialysate for treatment.
Kinked green line sleeves.	Unkink the lines.
The drain line is not properly connected.	Disconnect and reconnect the drain line.
The drain line is blocked.	Flush the drain line.

3. Push on the SAK to mix the fluid.
4. Press **GO**  to retry the test.
5. If the control panel displays "Clamp Line With Blue Check Valve," then close the clamp on the SAK fill line (line with the blue check valve) with a non-serrated clamp.
6. Press **GO** .
 - › The PureFlow SL runs for approximately three minutes.
 - › After about three minutes, the control panel displays "Remove Clamp."
7. Remove the clamp from the SAK fill line.
8. Press **GO**  to retry the test.
9. If the alarm continues, call NxStage Technical Support.

Alarm 44: No Flow Detected Through Conductivity Line

1. Press **STOP** .
2. Identify and fix the probable cause(s).

Check for	Do
The flow through the conductivity line is slow or blocked.	Check that the following are true: ▪ The conductivity line (orange) is connected to the conductivity sensor. ▪ The orange conductivity clamp is open. ▪ None of the SAK lines are kinked, pinched or have a closed clamp. ▪ The control unit drain line is connected and can drain. ▪ The SAK has unfolded properly.

3. Press **GO** .

Alarm 51: Output Pressure High

1. Press **STOP** .
2. Identify and fix the probable cause(s).

Check for	Do
A line that is kinked, improperly connected, or has a closed clamp.	Check that the following are true: ▪ All of the clamps are open and there are no kinks in any of the lines from the PAK and control unit to the SAK. ▪ The drain line is connected to the back of the control unit.

3. Press **GO** .
4. If the alarm continues, call NxStage Technical Support.



Chapter 5: How do I recognize a problem?

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Introduction

Managing medical complications can seem overwhelming, but the chance for complications should be minimized if you:

- Understand and follow the instructions and information in the user guides, your internal policies and procedures, and the patient's prescription.
- Understand what causes medical complications and follow the preventive measures.

This quick reference guide does not contain an exhaustive list of issues, signs/symptoms, causes, and treatment and prevention information.

IMPORTANT:

Some causes and treatment steps are bold, indicating the need for urgent action. Some complications require immediate attention.

Even if this quick reference guide instructs you to rinse back blood, do NOT rinse back blood in the following situations:

- If your internal policy instructs you not to do so.
 - If the blood circuit or patient lines are clotted.
 - If the blood is suspected of being hemolyzed.
 - If air is seen in the blood circuit or patient lines.
-

Fluid Issues: Cramps

Signs/Symptoms	Possible Cause
☐ Painful muscle tightness, most often occurring in the legs and abdomen.	☐ 1. Removing too much fluid. ☐ 2. Removing fluid too quickly. ☐ Other:

Treatment	Prevention
☐ Check the patient's BP and give _____mL of normal saline if the BP is less than _____. ☐ Reduce the ultrafiltration rate on the cyclor to _____L/hr. ☐ Check the patient's BP again and give _____mL of normal saline if the BP is less than _____. ☐ Decrease the ultrafiltration volume on the cyclor to _____L or by _____liters. ☐ Refer to internal policy the patient's BP is less than _____. ☐ Other: _____ _____ _____ _____ _____	☐ Always determine the patient's ultrafiltration volume and then rate correctly by subtracting an accurate dry-weight from an accurate pre-dialysis weight. To obtain an accurate pre-dialysis weight Ensure that each patient: › Is weighed just before each treatment. › Uses a calibrated digital scale (medical grade preferred) that measures in kilograms. › The scale is on a firm, flat surface, such as bare floor, not on carpet. › Weighed in similar weight clothing each day for both the pre- and post-treatment weights. Dry weight is: ▪ Weight without extra fluid in the patient's tissues (face, hands, abdomen, legs, ankles). ▪ Provided by the medical facility after a patient's physical assessment. ☐ Ensure that the treatment parameters are entered correctly on the cyclor. ☐ Do not exceed the patient's maximum allowable ultrafiltration volume and or ultrafiltration rate. ☐ Other: _____ _____

Fluid Issues: Hypotension (Low Blood Pressure)

Signs/Symptoms	Possible Cause
☐ Dizziness ☐ Fast or slow heart rate ☐ Paleness ☐ Cold clammy skin ☐ Nausea and/ or vomiting ☐ Cramping ☐ Change in mental status ☐ Other: 	☐ 1. Blood pressure medications may need to be decreased or stopped. ☐ 2. Removing too much fluid or removing fluid too quickly. ☐ 3. Eating immediately before or during dialysis. ☐ 4. Abnormally fast or slow heart rate. ☐ Other:

Treatment	Prevention
In an emergency situation: ☐ Position the patient in the Trendelenburg position. ☐ Give _____mL of normal saline ☐ Perform an emergency rinseback. For causes #2 and #3 ☐ Position the patient in the Trendelenburg position. ☐ Give _____mL of normal saline. ☐ Reduce the ultrafiltration rate on the cyclor to _____L/hr. ☐ Check the patient's BP again and give _____mL of normal saline if the BP is less than _____. ☐ Decrease the ultrafiltration volume on the cyclor to _____L or by _____liters. ☐ End treatment and perform automated rinseback. ☐ Give additional rinseback volume of _____ mL normal saline. ☐ Refer to internal policy if the patient's BP is less than _____. ☐ Other: For cause #4 ☐ Call emergency personnel (911). ☐ Perform automated rinseback. ☐ Perform emergency rinseback. ☐ Check the patient's heart rate. ☐ Other:	For cause #1 ☐ Take blood pressure prior to each dialysis treatment and contact the physician or dialysis provider if it is below the patient's normal range. Discuss instructions related to blood pressure medication. For cause #2 ☐ Always determine the ultrafiltration volume and rate correctly by subtracting an accurate dry weight from an accurate pre-dialysis weight. See "To obtain an accurate pre-dialysis weight" on page 93 for additional information related to pre-dialysis and dry weight. For cause #3 ☐ Do not have meals just before or during dialysis. For cause #4 ☐ Complete pre-dialysis assessment prior to each dialysis treatment. Do not start treatment if the patient is experiencing a fast or slow heartbeat. Refer to internal policies or contact the physician. ☐ Other:

Fluid Issues: Hypertension (High Blood Pressure)

Signs/Symptoms	Possible Cause
☐ Headache ☐ Swelling of ankles, legs, hands, face. ☐ Difficulty breathing. ☐ May have no symptoms, therefore it is important to routinely check the patient’s BP. ☐ Other:	☐ 1. Excess body fluid from gaining too much weight between treatments. ☐ 2. Excess body fluid from not removing enough ultrafiltrate during previous treatments or missing treatments. ☐ 3. Prescribed blood pressure medications not taken correctly or prescription may need to be adjusted. ☐ Other:

Signs/Symptoms	Possible Cause
For causes #2 and #3 ☐ Check the patient's BP. If it is greater than _____ refer to internal policy. ☐ Other:	For cause #1 ☐ Follow fluid and diet recommendations. For cause #2 ☐ Always determine the ultrafiltration volume and rate correctly by subtracting an accurate dry weight from an accurate pre-dialysis weight. See "To obtain an accurate pre-dialysis weight" on page 93 for additional information related to pre-dialysis and dry weight. ☐ Ensure that the treatment parameters are entered correctly on the cyclor. ☐ Ensure that any fluid consumed or normal saline bolus delivered after obtaining the pre-dialysis weight is added to the ultrafiltration volume. ☐ Follow the treatment schedule. Do not skip treatments. For cause #3 ☐ Complete the pre-dialysis assessment and notify the physician of high blood pressure prior to dialysis. Refer to internal policies for adjusting blood pressure medication.➤ ☐ Other:

Cardiac Issues: Chest pain/angina

Signs/Symptoms	Possible Cause
☐ Pain or tightness in the chest, arm, back or jaw. ☐ Pale, cool, clammy skin. ☐ Nausea ☐ Other:	☐ 1. Low blood pressure ☐ 2. Low oxygen level in the heart. ☐ Other:

Treatment	Prevention
For causes #1 and #2 ☐ Refer to internal policies. ☐ Perform automated rinseback, or ☐ Perform emergency rinseback. ☐ Other:	For cause #1 ☐ Always determine the ultrafiltration volume and rate correctly by subtracting an accurate dry weight from an accurate pre-dialysis weight. See “To obtain an accurate pre-dialysis weight” on page 93 for additional information related to pre-dialysis and dry weight. ☐ Refer to internal policies regarding patient complaint of chest pain/angina to ensure blood pressure medication is assessed prior to treatment. ☐ Take blood pressure prior to each dialysis treatment and refer to internal policies if the patient’s BP is below the normal range. For cause #2 ☐ Refer to internal policies regarding patient complaint of chest pain/angina for further assessment and instructions prior to treatment. ☐ Other:

Cardiac Issues: Arrhythmia (Irregular Heart Beat)

Signs/Symptoms	Possible Cause
☐ Abnormal or irregular pulse (skipped or extra beats). ☐ Abnormally slow (less than _____) or abnormally fast (greater than _____) heart rate. ☐ Feelings in the chest of pounding, bounding, or strong heartbeat. ☐ Other:	☐ 1. Electrolyte (potassium) imbalance. ☐ 2. Known underlying heart disease. ☐ 3. Unknown heart disease. ☐ 4. Poor blood circulation resulting in low oxygen level in the heart. ☐ 5. Low or high fluid volume causing low or high blood pressure. ☐ Other:

Treatment	Prevention
For causes #1, #2, #3, and #4 ☐ Refer to internal policies. ☐ Perform automated rinseback; or ☐ Perform emergency rinseback. For cause #5 ☐ Check the patient’s blood pressure and refer to either: › For hypotension (low), see “Fluid Issues: Hypotension (Low Blood Pressure)” on page 94. › For hypertension (high), see “Fluid Issues: Hypertension (High Blood Pressure)” on page 96. ☐ Other:	For all causes ☐ Refer to internal policies. ☐ Other:

Blood Issues: Infection

Signs/Symptoms	Possible Cause
☐ Feeling hot. ☐ Fever (Temperature higher than ____) ☐ Chills ☐ The vascular access site is red, warm to touch, swollen, or draining. ☐ Other: 	☐ 1. Infection (local or whole body). ☐ Other:

Treatment	Prevention
For cause #1 ☐ Check body temperature. ☐ Refer to internal policies. ☐ Other:	For cause #1 ☐ Never cannulate an access that is suspected of potential infection. ☐ Always contact the physician before cannulating. ☐ Refer to internal policies. ☐ Other:

Blood Issues: Prolonged Bleeding

Signs/Symptoms	Possible Cause
☐ Oozing around the needle at the vascular access puncture site. ☐ Prolonged bleeding after removing vascular access needles. ☐ More skin bruising than normal ☐ Unusual bleeding anywhere or any time. ☐ Other:	☐ 1. Needle manipulation resulting in widening puncture site. ☐ 2. Restricted blood flow through a narrowed / injured blood vessel. ☐ 3. For non- buttonhole fistula or graft, incorrect site rotation. ☐ 4. Too much heparin or other anticoagulant medication was given. ☐ Other:

Blood Issues: Prolonged Bleeding | 105

Blood Issues: Circuit Clotting

Signs/Symptoms	Possible Cause
☐ Changes in blood circuit pressures during treatment. Lower venous and effluent pressures indicate that clotting may be occurring within the dialyzer. ☐ Alarms and cautions 20, 21, 22, 24, 30, 32, 33, and 34 may signal poor blood flow, dialyzer clotting, and clotting blood lines. ☐ Dark-looking blood within the patient blood lines and at the venous header of the dialyzer. ☐ Blood stops pulsating within the access pressure pod. ☐ Other:	☐ 1. Repeated stopping of blood flow due to multiple alarms. ☐ 2. Prolonged alarm recovery. The operator is repeatedly pressing MUTE  - STOP  - TREATMENT  without resolving the cause of the alarm. ☐ 3. Not enough heparin or other anticoagulant medication. ☐ 4. Air in the blood circuit ☐ Other:

Treatment	Prevention
For all causes ❑ If the dialyzer or blood lines are clotted, end the treatment. Do NOT rinse back the blood. For cause #3 ❑ Refer to internal policy regarding anticoagulant medication. For cause #4 ❑ Remove air from the blood circuit promptly, following the instructions in the cyclor user guide. ❑ Ensure that the arterial and venous patient blood line connections are secure. ❑ Other:	For all causes ❑ The risk of blood clotting increases when the blood pump is stopped, such as during alarms. If you can not resolve the issue within 2-3 attempts, rinse back the blood unless the blood circuit is clotted, the blood is hemolyzed, air is seen in the blood circuit or in the patient blood lines. Contact the physician or dialysis provider. ❑ Routinely monitor circuit pressures and periodically flush the dialyzer to identify early stages of clotting and plan interventions. ❑ Refer to internal policies regarding clotting or blood loss for further instructions prior to treatment. For causes #1 and #2 ❑ Ensure blood flow is unrestricted. Clotting in the dialyzer and/or blood lines begins as soon as the blood pump is off. ❑ Respond to all alarms promptly and correctly per the user guide instructions. ❑ Contact NxStage Technical Support for additional troubleshooting alarm assistance. For cause #3 ❑ Refer to internal policy for anticoagulant assessment prior to treatment. ❑ Follow the patient's anticoagulant prescription. For cause #4 ❑ Promptly remove all air from blood lines and dialyzer promptly following the instructions in the cyclor user guide for Alarm # 10 and # 11. ❑ Prime the cartridge following the instructions in the cyclor user guide before starting treatment. ❑ Ensure that the arterial and venous patient blood line connections are secure before starting treatment.

Blood Issues: Accidental Blood Circuit Disconnection

Signs/Symptoms	Possible Cause
☐ Blood on the patient’s clothes, chair, and/or floor. ☐ Low blood pressure. ☐ Fast heart rate. ☐ Dizziness/ fainting. ☐ Seizure. ☐ Heart stopping. ☐ Other:	☐ 1. Patient blood lines and vascular access lines or connections came apart. ☐ 2. The catheter port cap is not connected and/or the catheter clamp is not closed. ☐ 3. The vascular access was not taped properly and fell out. ☐ 4. The fistula needle came out of the access. ☐ 5. The vascular access sites were not visible during treatment. ☐ Other:

Treatment	Prevention
For all causes ☐ End the treatment. Do NOT rinse back the blood. ☐ Call emergency personnel (911) for significant blood loss signs (low blood pressure, dizziness, fainting, seizure, heart stopping). ☐ Refer to internal policy. ☐ Other:	For all causes ☐ Respond to all system pressure alarms and cautions. Repeatedly pressing MUTE  - STOP  - TREATMENT  without resolving the cause of the alarm can result in more significant blood loss. ☐ Do not allow pets in treatment area during treatment. ☐ Minimize distractions caused by the presence of untrained personnel such as children and other family members. ☐ Routinely monitor for blood leaks; the cyclor may not sense all leaks. For cause #1 ☐ Ensure that the patient blood lines and the vascular access lines and connections are visible at all times during treatment and rinseback. Ensure that all manual connections, especially the rotating luer locks connecting the patient blood lines to the vascular access lines, are secure and fluid tight. ☐ Test that the fluid detection sensor, if used, is functioning and is correctly installed in the base during treatment. Respond to fluid detection sensor alarms. ☐ Monitor for blood leaks. For cause #2 ☐ Keep the catheter port capped and clamped when not in use. For cause #3 ☐ Ensure that the vascular access is taped securely. ☐ Ensure the access sites and connections are visible during treatment. DO NOT cover with sheets, blankets or clothing. ☐ Other:

Blood Issues: Hemolysis

Signs/Symptoms	Possible Cause
☐ Chest, back or abdominal pain. ☐ Shortness of breath. ☐ Low blood pressure. ☐ Cherry-red coloured blood. ☐ Burning in the venous access site. ☐ Pink-tinged waste or effluent without the occurrence of a cyclor Alarm 60: Blood Detected in Waste Line. ☐ Other:	☐ 1. Blood forced through an obstructed, narrowed, clotted or severely kinked blood line, catheter or needle. ☐ 2. High arterial pressure outside the patient's normal range. ☐ 3. Constant starting and stopping of blood pump due to multiple alarms. ☐ 4. Underlying medical condition or medication, such as heart valve replacement, recent blood transfusion reaction. ☐ 5. Source water and/or dialysate are inadvertently contaminated (for example: bleach, chloramines). ☐ Other:

Treatment	Prevention
For all causes ☐ End the treatment. Do NOT rinse back the blood. ☐ Call emergency personnel (911) . ☐ Refer to internal policy. ☐ Other:	For cause #1 ☐ Inspect each cartridge before use for any kinks. Do not use any blood tubing that is dented or flattened by more than one third of its diameter. ☐ Follow the prescription for access needle size and blood flow. ☐ Monitor for signs of hemolysis during treatment. Do not kink lines when placing the dialyzer in the filter holder. For cause #2 ☐ Monitor the arterial pressure and watch for any values outside of normal ranges. Cyclor Alarm or Caution 24: Access Pressure Decreasing to Low Limit will occur if the arterial pressure goes to -220 mmHg. ☐ The cyclor displays the arterial access pressure without the negative sign. Therefore, when the arterial pressure becomes lower (more negative), the arterial pressure displayed on the cyclor becomes a higher number, indicating a more restricted flow. For cause #3 ☐ Respond to all alarms promptly and correctly per the user guide instructions. ☐ Contact NxStage Technical Support for additional troubleshooting alarm assistance. For cause #4 ☐ Ensure that the physician or dialysis provider is always aware of the patient's current medical condition and medications. For cause #5 ☐ Ensure source water testing meets PureFlow SL source water requirements prior to making a batch of dialysate. ☐ Respond to all PureFlow SL Alarms and Cautions per the user guide. ☐ Ensure chloramines test less than or equal to 0.1 ppm (parts per million) prior to dialysate use. ☐ Ensure bleach (used to clean equipment) does not enter the dialysate.

Blood Issues: Air Embolism

Signs/Symptoms	Possible Cause:
☐ Chest pain. ☐ Trouble breathing. ☐ Coughing. ☐ Blue lips, fingers, toes. ☐ Visual disturbances. ☐ Confusion. ☐ Loss of consciousness. ☐ Other:	☐ 1. Air not removed from the blood circuit is entering blood stream. ☐ 2. Air is entering the catheter and blood stream if the catheter is left uncapped or unclamped or if the blood line becomes disconnected while the blood pump is still running. ☐ Other:

Treatment	Prevention
For all causes ☐ End the treatment. Do NOT rinse back the blood. ☐ Call emergency personnel (911) . ☐ If possible, position the patient lying flat on the left side with their head down. ☐ Contact the physician or dialysis provider for further instructions. ☐ Other:	For all causes ☐ During set up, ensure you insert the cartridge correctly within the cyclor. Manually press the lines into all three air detectors. ☐ Ensure all air is removed from the arterial and venous patient blood lines during “snap and tap”. ☐ Contact NxStage Technical Support for additional troubleshooting alarm assistance. ☐ Before performing rinseback, visually inspect the lines for air. Do not rinseback if air is present or if you are not able to recover from an air alarm. For cause #1 ☐ Respond to all alarms promptly and correctly per the user guide instructions. For cause #2 ☐ Tighten the cap and close the clamps on the catheter when not in use. ☐ Ensure the access and blood line connections are visible during treatment. ☐ Other:

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal blue lines across its entire width. The paper is otherwise completely empty, with no margins, text, or other markings.



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