

**Baxter**

AK 98

DIALYSIS MACHINE

**BAXTER KIDNEY CARE**

PD | HD | HDx | EDUCATION | SUPPORT

**QUICK REFERENCE GUIDE**

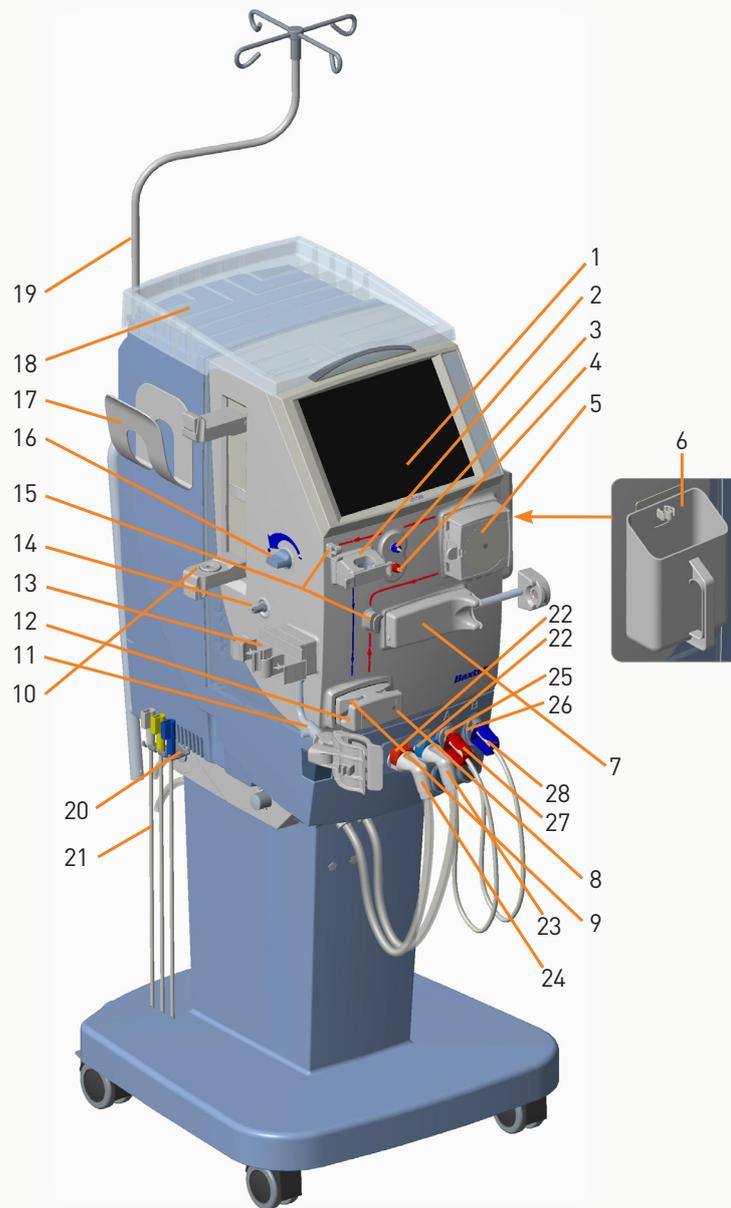


# CONTENTS

**Note:** The contents of this training material are based on the **AK 98** Dialysis Machine Operator's Manual for software 3.xx (HC12839002). Reviewing this material does not replace the training given to you by your healthcare provider, nor does it replace your responsibility to read and understand the full text of the Operator's Manual prior to operating the machine. If there are differences between the actions described here and the instructions contained in the Operator's Manual, then the information from the Operator's Manual takes precedence.

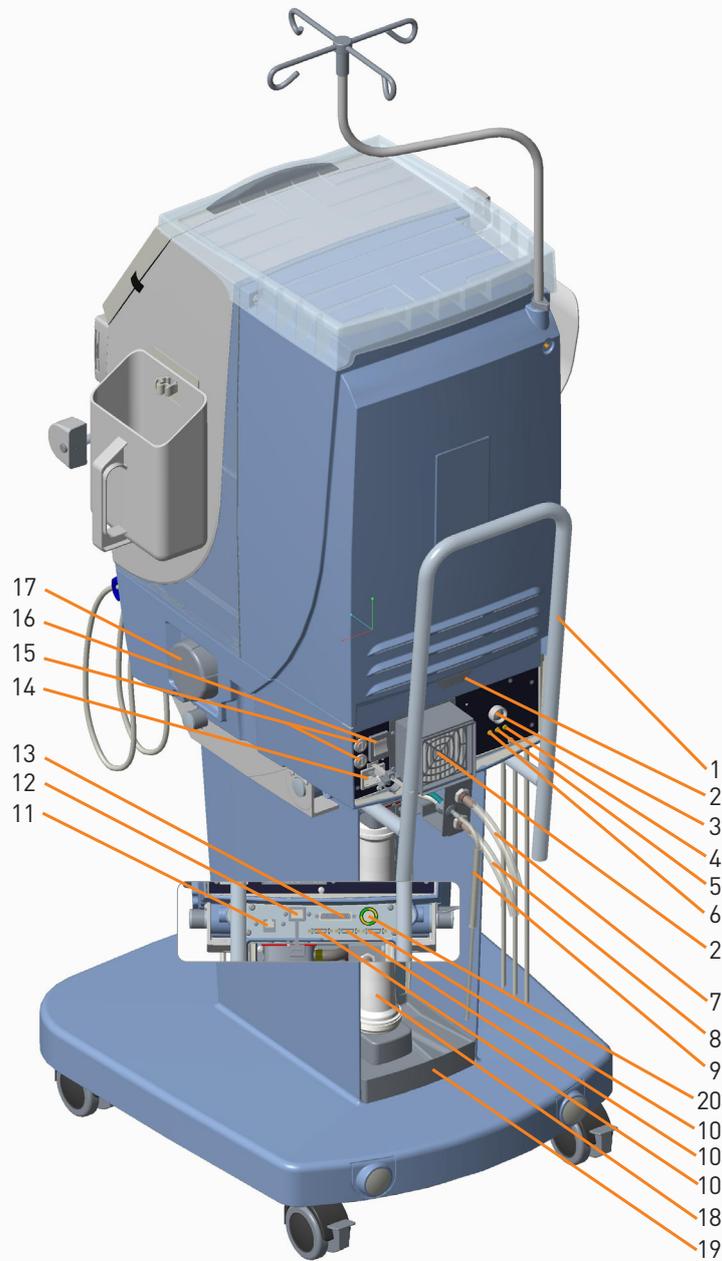
<b>AK 98 Configuration</b>	<b>03</b>	<b>Advanced Functions of AK 98</b>	<b>29</b>
• Front and Side Panels	03	• Profiling	29
• Back Panel	04	• Diascan	32
• Buttons on the User Control Panel	05	• Isolated UF (Ultrafiltration)	34
• Screen Overview	06	<b>Other Functions of AK 98</b>	<b>35</b>
<b>How to Use AK 98</b>	<b>07</b>	• Concentrate Standby Mode (CSBM)	35
• Operation Start Up	07	• Reactivate Concentrate Standby Mode	35
• Extracorporeal Circuit Preparation and Line Connection	08	• Service Menu	36
- Attaching the Arterial Blood Line	08	• Automatic Restart	37
- Attaching the Priming Solution	09	• Ultrafiltration (UF) Rate Limits	37
- Attaching the Venous Blood Line	10	• Blood Pressure Measurement (BPM) Alarm Limit Setting	38
- Attaching the Heparin Syringe	11	• Actual Blood Flow	38
• Priming	12	<b>Tips for Using AK 98</b>	<b>39</b>
• Recirculation	13	• Air Detector Activation	39
• Blood Pressure Monitor (BPM)	14	• Conductivity Actual and Calculated - C/P Values	39
• Manually Entering the Prescription	15	• Heparin Delivery	39
• Retrieving Patient Prescription	16	• Restart Using the On/Off Button	39
• Connecting the Patient	17	• Saline Loss	40
• Connect Patient After Concentrate Standby Mode (CSBM)	18	• Surface Cleaning and Disinfection	40
• Starting the Treatment	18	<b>Hemodialysis Basics</b>	<b>41</b>
• Stopping the Treatment, Rinseback, and Disconnecting the Patient	19	• How Hemodialysis Works	41
• Emptying the Dialyzer and BiCart	20	• The Dialyzer	41
• Disconnecting the Blood Line and Dialyzer	20	• Blood Access Types	42
• Disinfection and Rinsing	21	• Different Components of the Hemodialysis System	42
• Changing the Dialyzer and Blood Line During Treatment	22	• The Blood Monitor	43
• Replacing the BiCart Cartridge During Treatment	22	• The Fluid Monitor	44
• The Water Supply	45	• Efficiency of Hemodialysis	45
<b>AK 98 Troubleshooting</b>	<b>23</b>		
• Alarm Indication	23		
• How to Pause Treatment	23		
• What to Do During a Power Outage	24		
• Manual Rinseback	24		
• Changing a Wet Transducer	25		
• Screen Guidance and Resolution	26		

# AK 98 CONFIGURATION - FRONT AND SIDE PANELS



- |  |  |
|--|--|
| 1. Operator's panel                        | 15. Blood line guides                              |
| 2. Air detector                            | 16. Level adjustment knob                          |
| 3. Venous pressure transducer connector    | 17. BPM cuff holder                                |
| 4. Arterial pressure transducer connector  | 18. Top tray                                       |
| 5. Blood pump                              | 19. Infusion stand                                 |
| 6. Priming bucket                          | 20. Wand holder                                    |
| 7. Heparin pump                            | 21. Wand   |
| 8. Arterial blood line clamp               | 22. Dialysate ports for dialysate lines            |
| 9. Priming detector                        | 23. Dialysate line from machine to dialyzer (blue) |
| 10. BICART cartridge holder                | 24. Dialysate line from dialyzer to machine (red)  |
| 11. Arm for dialyzer holder                | 25. Dialysate port for red concentrate connector   |
| 12. Venous blood line clamp                | 26. Dialysate port for blue concentrate connector  |
| 13. Expansion chamber holder               | 27. Concentrate connector, red                     |
| 14. Blood pressure monitor (BPM) connector | 28. Concentrate connector, blue                    |

# AK 98 CONFIGURATION - BACK PANEL



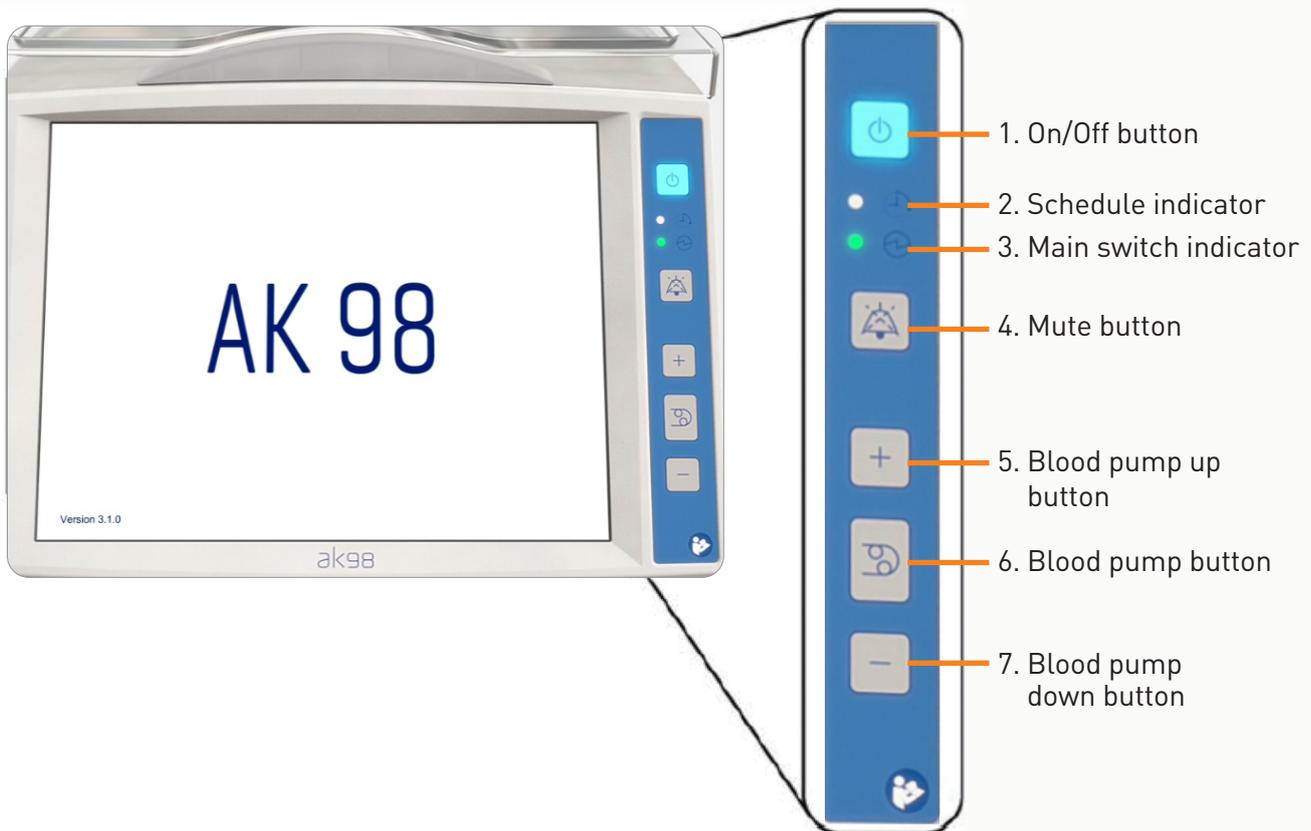
- 1. Transportation handle
- 2. Air filters
- 3. Halt button
- 4. Battery charge indicator
- 5. Battery connect indicator
- 6. Over temperature protection indicator

- 7. Inlet water tube
- 8. Outlet tube (drain)
- 9. Citric acid inlet tube
- 10. Remote panel contacts (not used)
- 11. Ethernet port
- 12. USB port
- 13. External communication port

- 14. Mains connection
- 15. Fuses
- 16. Main switch
- 17. Blood leak detector
- 18. Ultrafilter
- 19. Leakage detector tray
- 20. Potential equalisation connection

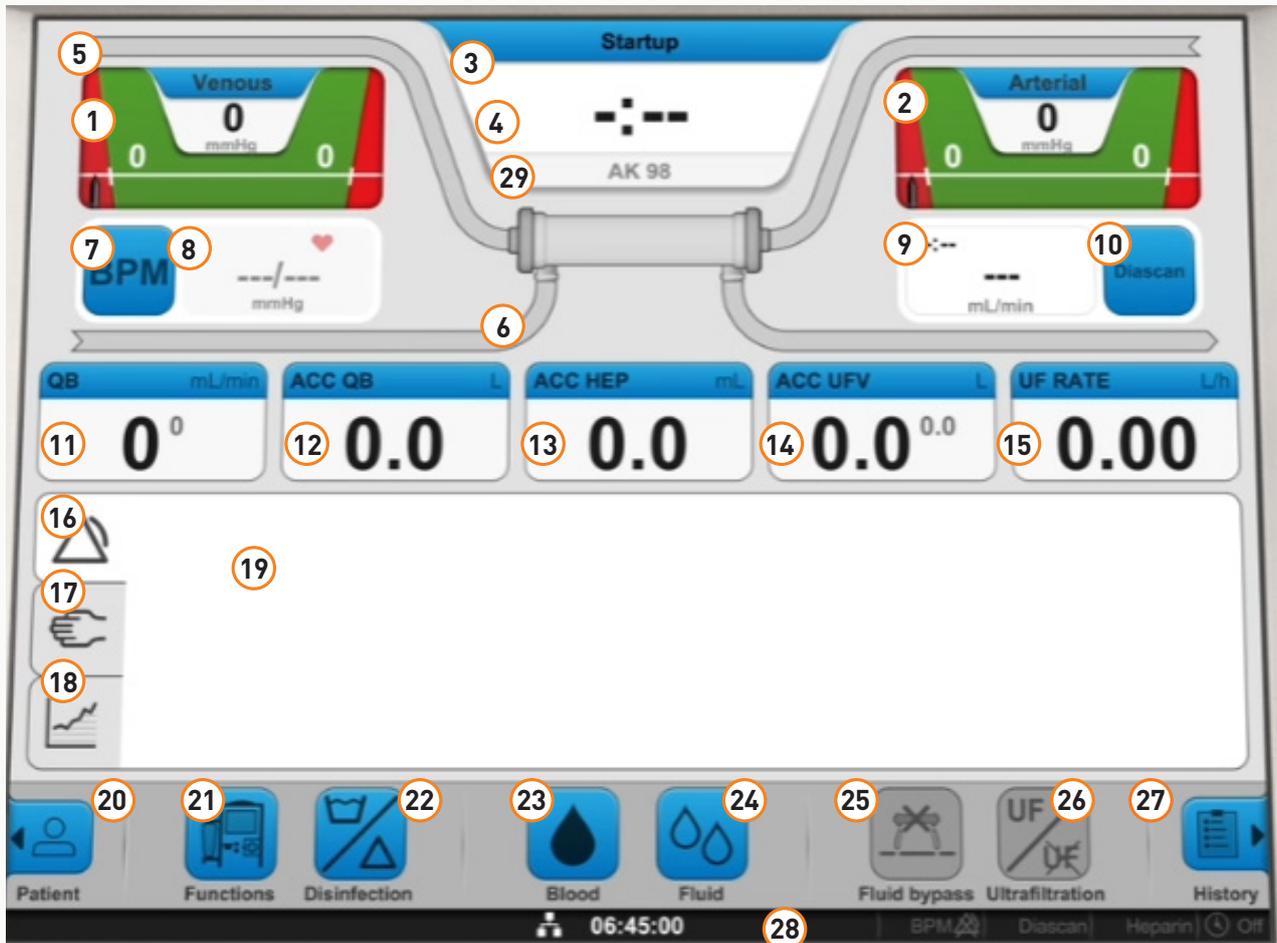
# AK 98 CONFIGURATION -

## BUTTONS ON THE USER CONTROL PANEL



1. **On/Off button:** Press to turn the machine on or off. Press and hold for 3 seconds while a disinfection program is running for the machine to automatically turn off after the disinfection program is completed.
2. **Schedule indicator:** When lit blue, a rinse or disinfection program is scheduled to begin automatically.
3. **Main switch indicator:** When lit green, the machine is connected to mains power supply and the main switch (behind the machine) is on.
4. **Mute button:** Press to mute alarm or attention sounds. Press and hold to turn alarm and attention sounds back on.
5. **Blood pump up button:** Press to increase blood pump speed.
6. **Blood pump button:** Press to start or stop the blood pump.
7. **Blood pump down button:** Press to reduce blood pump speed.

# AK 98 CONFIGURATION - SCREEN OVERVIEW



1. Venous pressure control
2. Arterial pressure control
3. Machine state indicator
4. Time indicator
5. Blood path
6. Fluid path
7. Blood pressure monitor (BPM) button
8. Blood pressure monitor (BPM) read out field
9. Diascan read out field
10. Diascan button
11. Blood flow rate
12. Total blood volume processed
13. Total heparin volume infused
14. Total UF volume removed
15. Ultrafiltration rate
16. Alarm tab

17. Information tab
18. Treatment graph tab
19. Information field
20. Patient page
21. Functions button
22. Disinfection button
23. Blood button
24. Fluid button
25. Fluid bypass button
26. Ultrafiltration (UF) button
27. Treatment history page
28. Status bar
29. Monitor identifier (Nickname)

**Note:** Treatment overview fields (11-15) are configurable. Transmembrane pressure (TMP) is also available.

# HOW TO USE AK 98

## Operation Start Up

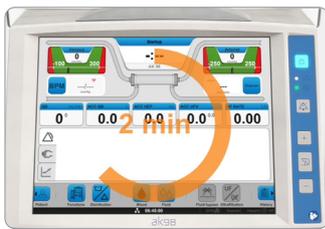
### Pre-treatment Check

- The main power cable must be connected to the main power supply.
- The main switch must be turned on.
- The water supply must be connected to the inlet water and powered on.
- The outlet tube (drain) should be properly placed with an air gap between the dialysis machine and the drain.
- The dialysate lines should be connected to the dialysate ports.
- Acid concentrate, BiCart, dialyzer, bloodline, and saline must be ready for use.



1. Gently press the On/Off button to turn on the machine.

### Functional Check



2. Before a treatment can be started the dialysis machine performs a functional check. Do NOT attach blood lines or open the blood pump door until the blood pump button is flashing.



3. Remove the red concentrate connector from the dialysate port.
4. Attach the white wand to the red concentrate connector. Place the wand in the acid concentrate container.



5. Select the concentrate combination to be used from the preset options on the screen.



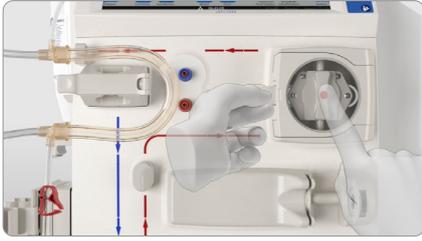
6. Press the release buttons to release the latches. Open the BiCart cartridge holder. Pull the upper latch out and up. Pull the lower latch down.
7. Remove the caps from the BiCart cartridge and attach it narrow end down.
8. While supporting the lower latch, press down the upper latch to secure the cartridge.



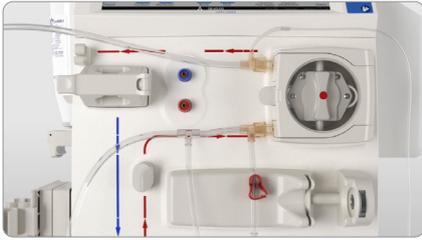
9. Attach the dialyzer in the holder. If necessary, squeeze the spring-clip to place the dialyzer in the holder. Move the dialyzer caps to the dialysate ports on the dialyzer to prevent saline loss.
10. Hang the saline bag on the IV pole.

# HOW TO USE AK 98

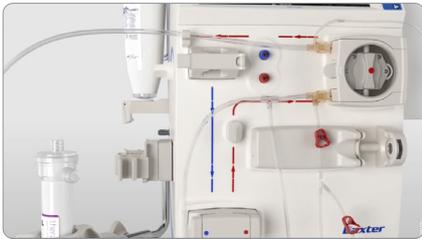
## Extracorporeal Circuit Preparation and Line Connection - Attaching the Arterial Blood Line



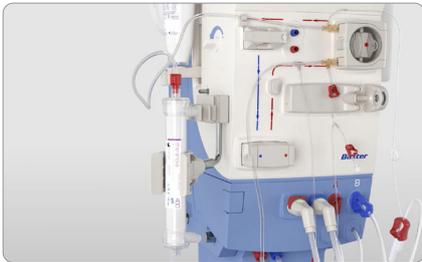
1. Open the blood pump door. Press the center of the cover and pull the tab.
2. Load the blood pump segment into the blood pump. Make sure the arterial pressure transducer points down and the heparin line is at the top.



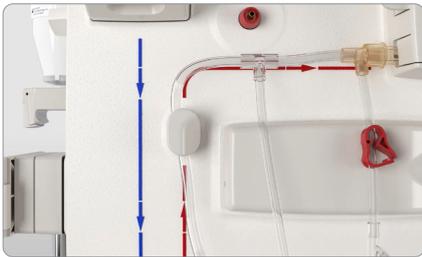
3. The blood pump segment collars must be outside of the pump housing.
4. Hold the segment in place and close the blood pump door. Do NOT push the segment into the blood pump rotors.



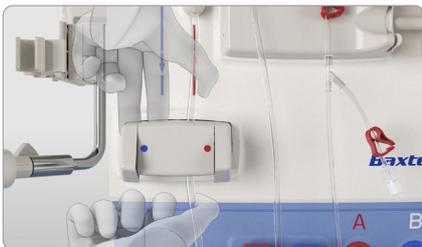
5. Gently press the blood line into the upper guide.



6. Remove the protective caps and attach the end of the arterial blood line to the dialyzer. Make sure the arterial blood line is securely attached to the dialyzer.



7. Route the line through the line guide.



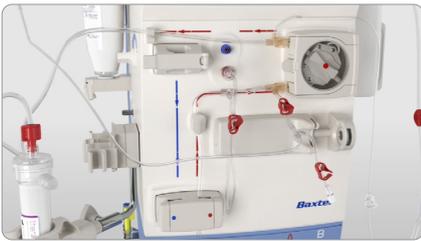
8. Insert the blood line into the arterial clamp (marked with a red dot).
9. Gently pull the blood line down to secure in place.

# HOW TO USE AK 98

## Extracorporeal Circuit Preparation and Line Connection - Attaching the Priming Solution



1. Attach the arterial blood line to one of the blood line holders in the prime bucket. Keep the arterial clamp open.
2. Clamp the infusion line and spike the saline bag. Ensure connection is secure.



3. Attach the arterial pressure transducer protector to the red arterial pressure transducer connector. Turn to secure the connections - transducer line to transducer protector and transducer protector to transducer connector on the machine.

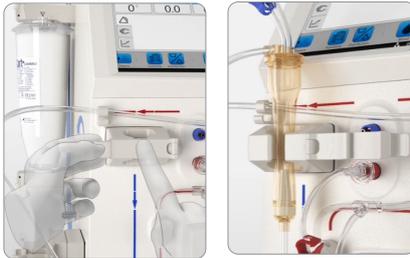
**Note:** Do NOT clamp the pressure transducer line.

# HOW TO USE AK 98

## Extracorporeal Circuit Preparation and Line Connection - Attaching the Venous Blood Line



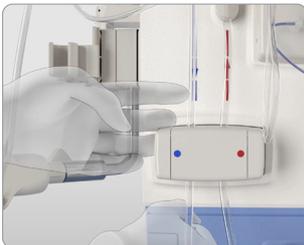
1. Attach the venous blood line to one of the blood line holders in the prime bucket. Close the clamp on the venous patient line.



2. While firmly pressing the center of the cover, pull the tab towards you to open the air detector cover.
3. Pinch the venous drip chamber and place it in the air detector.
4. Adjust the position of the venous drip chamber such that the filter is below the air detector and that the chamber extends above the top of the air detector. While pressing the center of the cover, close the air detector cover.



5. Remove the protective caps and connect the end of the venous blood line to the dialyzer. Make sure the venous blood line is securely connected to the dialyzer.



6. Place the blood line into the venous clamp (marked with a blue dot).
7. Gently pull the blood line down to secure in place.
8. Make sure that the venous blood line is properly placed in the priming detector and venous blood line clamp. The venous blood line must be properly installed in the priming detector so that blood can be detected at the start of treatment.



9. Attach the venous pressure transducer protector to the blue venous pressure transducer connector. Turn to secure the connections - transducer line to transducer protector and transducer protector to transducer connector on the machine.

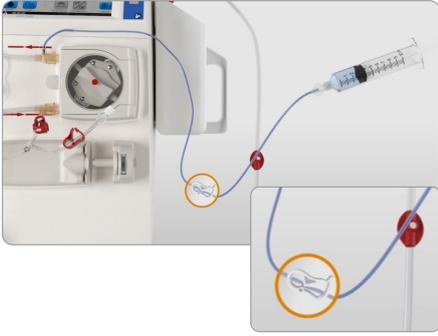
**Note:** Do NOT clamp the pressure transducer line.



10. Close clamps as indicated on the image.

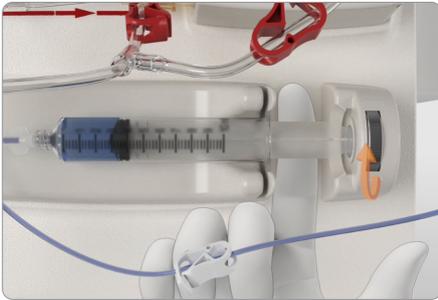
# HOW TO USE AK 98

## Extracorporeal Circuit Preparation and Line Connection - Attaching the Heparin Syringe



1. Attach the prepared syringe to the heparin line.
2. Prime the heparin line with the solution up to the point where the arterial blood line starts. The luer lock must be properly attached.
3. Close the clamp on the heparin line.
4. Press the end of the piston on the heparin pump and pull out the piston to extend it as much as possible.

**Note:** The locking wheel must be fully turned downwards before you can insert the syringe into the heparin pump.



5. Insert the syringe into the pump. The plastic collar at the end of the syringe must fit in the grooves of the pump. When using a syringe with total volume less than 20 mL, a heparin pump adapter must be installed to accommodate the syringe.
6. Push the piston back to its original position and insert the plastic flat head of the plunger into the groove next to the locking wheel.
7. Turn the locking wheel upwards until you feel resistance.
8. Gently pull the plunger to check that the syringe is properly attached.

# HOW TO USE AK 98

## Priming



1. Open the clamp of the arterial blood line.
2. Open the infusion line clamp(s).
3. Turn the dialyzer over so that the blue end is up. This helps remove the air from the dialyzer.
4. Manually prime the pre pump segment of the arterial blood line by gravity.
5. When the pre pump segment of the arterial blood line is primed and priming fluid has reached the prime bucket, close the arterial blood line clamp and open the venous blood line clamp.
6. Check that there are no kinks in the blood lines.
7. Press the flashing blood pump button to start the blood pump and activate the priming.



9. Once a small volume of priming fluid has reached the venous chamber, adjust the level of priming fluid in the venous drip chamber with the adjustment knob. The level should be well above the air detector head.
10. To avoid unnecessary air detector alarms during set up, wait to activate the air detector until all air has been removed from the circuit.

**Note:** The air detector is automatically activated when Connect patient is selected.



11. When the blood pump stops, turn the dialyzer over so that the red end is up.
12. If not already done, attached the dialysate lines to the dialyzer. Connect the red dialysate line from the machine to the same side of the dialyzer as the arterial blood line. Connect the blue dialysate line from the machine to the same side of the dialyzer as the venous blood line.
13. Press the Fluid Bypass button.

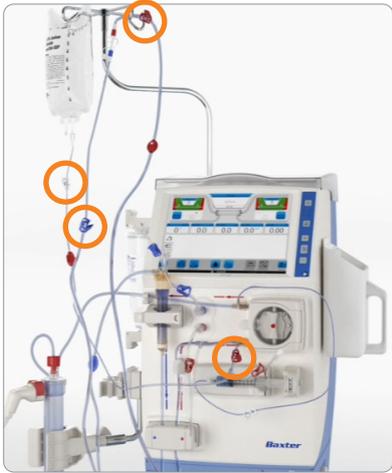
# HOW TO USE AK 98

## Recirculation



When priming is complete, the option for Recirculation will appear.

1. Press Recirculation.
2. Connect the patient ends of the bloodlines using the recirculation connector. Ensure both patient bloodline clamps are open.
3. Check that the clamps on the infusion line are open.
4. Start the blood pump.



5. Adjust the level of saline in the venous drip chamber using the adjustment knob, as necessary. The level should be well above the air detector sensor head.



6. When recirculation is complete, prior to stopping the blood pump, ensure:
  - Dialyzer is in treatment position (arterial end up)
  - Machine is not in Concentrate Standby Mode
  - Dialysate path is green

# HOW TO USE AK 98

## Blood Pressure Monitor [BPM]



The blood pressure cuff is connected to the side of the machine.

### Single Blood Pressure Measurement

Press the BPM readout field. The machine will start taking the measurement. The heart icon and BPM will start flashing while measurement is taken.

**Note:** If you press the BPM field twice, the measurement will stop.

### Results

The measured value will appear in the BPM measurement output field.

### How to Stop Measuring:

Press the BPM measurement output field to stop taking the measurement that is currently in progress.



### Automatic Blood Pressure Measurement

1. Press the BPM button.
2. Select the Setup tab.
3. Press Auto mode.
4. Press the time interval.
5. Set the frequency of measuring blood pressure between 5-60 minutes from the blood pressure monitor.
6. Press OK.
7. Activate automatic blood pressure measurements. The machine will start taking the measurement when activated.

**Note:** The clock symbol appears by the BPM icon on the status bar when automatic blood pressure measurement is activated. The BPM icon and clock symbol flash when a blood pressure measurement is taken.



### Measurement History

Blood pressure measurements will be recorded and saved in the log during treatment. Measurement data will be displayed in the History tab.

1. Press the BPM button.
2. Select the History tab.
3. Press History.



# HOW TO USE AK 98

## Manually Entering the Prescription



### Set Treatment Time

1. Press the time indicator on the screen.
2. Press treatment time.
3. Set the desired treatment time and press OK.



### Set Ultrafiltration Goal

4. Press the time indicator on the screen.
5. Press UF volume.
6. Enter the patient's ultrafiltration goal and press OK.  
Check the calculated/resulting UF rate.

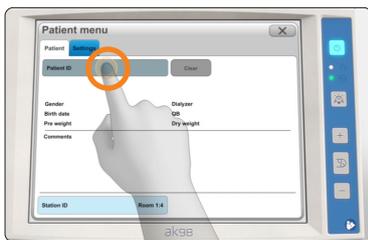
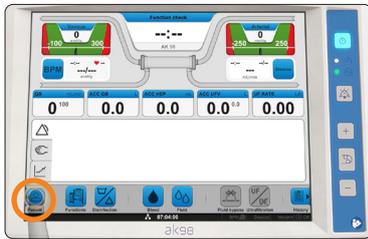
### Set Heparin Values

7. Press the Blood button.
8. Select the Heparin tab.
9. Press the settings one at a time, then set up the desired parameters, such as heparin bolus dose, heparin flow rate, stop time, etc. according to the prescription.
10. If a heparin bolus dose is needed at the start of treatment, press Heparin bolus dose and set a bolus dose (mL) appropriate for the patient.



# HOW TO USE AK 98

## Retrieving Patient Prescription



**Note:** Applies only for bidirectional connectivity.

1. Press the Patient button.
2. Press the Patient ID bar.
3. Enter your ID and press OK.
4. Carefully check the correct patient data has been retrieved, and then press Confirm to accept.
5. Review the prescription dialog box.

Shows the prescription parameters which have come from the EHR/EMR. The other parameters are either your facility's settings, or the machine default values.

Any parameter can be changed if needed by pressing the blue bars.

Shows the prescription parameters that have come from the EHR/EMR and have been changed.

6. Verify that all the required treatment parameters have been set correctly, and then press OK.



The Patient button is filled in and has a check mark. This confirms the machine is running with the patient prescription coming from the EHR/EMR.

**Note:** The treatment parameters can also be entered manually in the Patient menu under the Settings tab.

# HOW TO USE AK 98

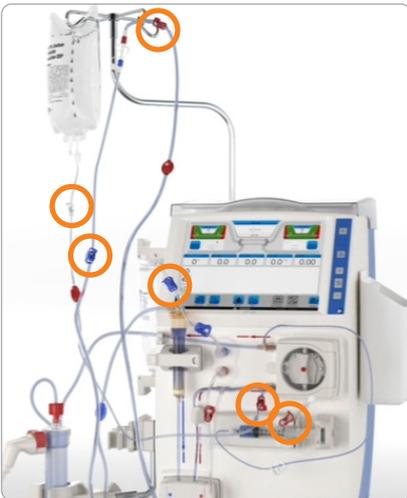
## Connecting the Patient



**Note:** Blood pump must be stopped after recirculation for the Connect patient option to appear. Wait to stop the blood pump until the dialysate line on the operator's panel is green.



1. Check that the venous line is correctly placed in the priming detector.
2. Press the Connect Patient button on the screen to enter patient connection mode.



3. Clamp the infusion lines.
4. Clamp arterial and venous blood lines. Disconnect the arterial blood line from the recirculation connector.
5. Connect the arterial blood line to the arterial access (needle or catheter). Make sure the connection is tight and that there is no leakage.
6. Check that there is no air in the venous blood line.
7. Connect the venous blood line to the venous access (needle or catheter). Make sure the connection is tight and that there is no leakage.
8. Check that all relevant clamps are closed to prevent blood loss.



9. Press the flashing blood pump button to start the blood pump. The blood pump will start at the preset flow (default 100 mL/min).



10. Once the blood passes through the dialyzer and blood is detected by the priming detector, the blood pump will stop automatically.
11. The color of the blood path will turn red on the screen.

# HOW TO USE AK 98

## Connect Patient After Concentrate Standby Mode (CSBM)



- Turn the dialyzer to treatment position if not already done so.
- Connect patient mode can only be entered if the correct conductivity has been achieved (dialysate line is green).
- If Connect patient is pressed immediately following CSBM deactivation, the message "Incorrect dialysate composition, check dialysate. To close message, press Confirm" may appear.
- Wait to stop the blood pump until the dialysate line on the operators panel is green.
- Press Connect patient and continue connecting the patient.

## Starting the Treatment



Check that the blood path has turned red on the screen and that the treatment time is counting down. If not, check if the venous blood line is properly placed in the priming detector.



1. Press the flashing blood pump button to restart the blood pump.
2. Adjust the blood flow rate using the +/- buttons above and below the blood pump button.

**Note:** To adjust blood flow rate quickly, hold down the +/- buttons.



3. Press the flashing ultrafiltration button to start ultrafiltration.
4. Initiate blood pressure and activate the auto mode and interval time.



5. Check the arterial and venous pressures.

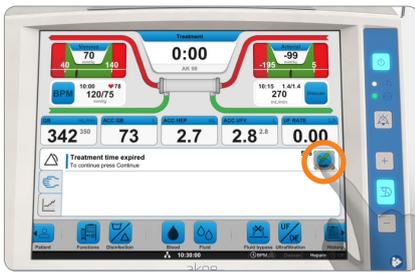
**Note:** The alarm limits can be set manually by pressing the pressure controls followed by "Close alarm limits".

**Note:** If the alarm limits are not set manually, the arterial and venous pressure alarm limits are automatically centralized around the actual values after the preset time.

6. Check that the venous drip chamber is filled to the correct level and that the clamp of the short line above the drip chamber is closed.

# HOW TO USE AK 98

## Stopping the Treatment, Rinseback, and Disconnecting the Patient



1. When the treatment is completed and the time reaches 0:00, an attention (596 Treatment time expired) will appear.

**Note:** To end the treatment early, press the time indicator and decrease the treatment time to 0:00.

2. Press the attention to confirm end of treatment.
3. Press the Rinse back button that appears in the Information field.
4. Press Confirm. The blood pump stops.



5. Close the clamp of the arterial blood line.
6. Disconnect the arterial blood line from the access.
7. Connect the arterial blood line to the rinseback line. Open the clamps on the rinseback line, infusion line, and arterial blood line.
8. Close the clamp on the infusion line closest to the blood pump.

**Note:** Continue to monitor the venous needle and venous pressure during rinse back.

9. Press the blood pump button to start the blood pump.
10. When the rinseback is completed and the blood pump stops, close the venous blood line clamp.

**Note:** The blood pump will stop upon reaching the preset rinseback volume or when the priming detector stops detecting blood.

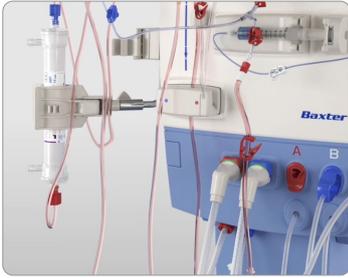
11. Disconnect the venous blood line from the access.
12. Press Disconnect patient.

**Note:** The option to give additional rinse back volume will also be available.

13. Confirm that the patient is physically disconnected from the machine.
14. Remove the venous blood line from the priming detector.

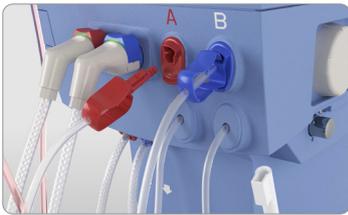
# HOW TO USE AK 98

## Emptying the Dialyzer and BiCart



1. Rotate the dialyzer so that the blue connectors are up.
2. Remove the blue (outlet) dialysate line from the dialyzer and connect to the blue dialysate port. The dialysate will drain from the dialyzer.
3. Once the dialyzer is empty, remove the red (inlet) dialysate line from the dialyzer and connect to the red dialysate port.

**Note:** The machine will not provide an alert when the dialyzer is empty, and it is not required to empty the dialyzer.



4. Follow the instructions on the screen and disconnect the connector from the concentrate supply and connect it to the port.



5. Drain the BiCart by following the on-screen instructions.
6. Pull the top of the BiCart cartridge holder latch outwards and lift it upwards to remove the BiCart cartridge.
7. Close the BiCart cartridge holder latches.

**Note:** The "Drain BiCart" option will not appear on the screen if the steps above are not followed in order. Always reference the on screen instructions to ensure the option will appear.

## Disconnecting the Blood Line and Dialyzer



1. Press the center of the blood pump door and pull the tab to open the door.
2. Hold the arterial blood line just before the pump segment. Pull the blood line outwards while rotating the blood pump counter-clockwise to remove the blood line.
3. Press the center of the air detector door and pull the tab to open the door, pinch the venous drip chamber and pull it out.
4. Disconnect and remove the arterial and venous blood lines.

# HOW TO USE AK 98

## Disinfection and Rinsing



Press the flashing Disinfection button to disinfect/rinse.  
Chemical substances or heat disinfection can be used to disinfect.



### Chemical Disinfection

1. Select the "Chemical" tab from the Disinfection/Rinse menu.
2. Select the disinfectant.
3. Connect the blue concentrate connector to the yellow wand.
4. Place the wand inside the disinfectant solution.
5. When the machine has withdrawn the disinfectant solution, an alarm will sound. Disconnect the concentrate connector from the wand and connect it to the machine.



### Heat Disinfection

1. Select the "Heat" tab from the Disinfection/Rinse menu.
2. Select "Heat".
3. Press Confirm.



### Heat Disinfection With Liquid Citric Acid

1. Make sure the disinfectant inlet tube from behind the machine is placed in the citric acid solution.
2. Select the "Heat" tab from the Disinfection/Rinse menu.
3. Select "Citric 20%" or "Short heat citric" and press Confirm.

 **Note:** Citric acid concentration is a preset.



# HOW TO USE AK 98

## Changing the Dialyzer and Blood Line During Treatment

If clotting occurs, you may have to change the blood line and dialyzer during treatment. If you must replace the dialyzer and blood line during treatment, all values and settings will be saved in the machine, and treatment will resume from where it left off.

**Note:** It is not necessary to end the treatment and start again to replace the circuit. Once the procedure is complete, the treatment will continue from when it was stopped.

**Note:** It is important to follow the instructions provided on the operator's panel in the sequence listed. Steps performed out of sequence may delay the option for priming and return to treatment mode. Once started, the new blood circuit procedure must be completed.



1. Press Functions.
2. Select New Blood Circuit and Confirm. The blood pump stops automatically.
3. Confirm New Blood Circuit with blood return when the blood pump stops.
4. Prepare for rinse back using the rinse back line on the arterial infusion line.
5. Select Rinse Back and Confirm.
  - Connect for Rinse Back using the rinse back line
  - Start blood pump
  - Stop blood pump when rinse back is completed. The rinse back will automatically stop after the preset rinse back volume, if not stopped manually before.
6. Disconnect patient and Confirm on the screen that patient is disconnected.
7. Remove venous line from the priming detector.
8. Move dialysate lines to dialysate ports on the machine.
9. Remove the used dialyzer, bloodlines, and heparin syringe.
10. Attach new blood lines, dialyzer, and heparin syringe.
11. Connect priming solution and press Confirm.
12. Gravity prime the arterial line before starting the blood pump
13. Start blood pump when ready for priming. When priming volume is achieved, the blood pump stops automatically.
14. Connect dialysate lines to the new dialyzer and press Bypass.
15. Select Recirculation, connect bloodlines for recirculation, and start blood pump.
  - When recirculation volume is achieved, prior to stopping the blood pump, ensure the dialyzer is in treatment position
  - Stop the blood pump and select Connect patient
16. Close infusion line clamp.
17. Start blood pump when patient is connected.
18. Restart the blood pump when blood has been detected.
19. Increase blood flow and start UF. Treatment will continue from where it was stopped.

**Note:** If not possible to return blood to patient, select Disconnect Patient, Confirm, and follow on-screen instructions.

## Replacing the BiCart Cartridge During Treatment



If you need to replace the BiCart cartridge with a new cartridge during treatment:

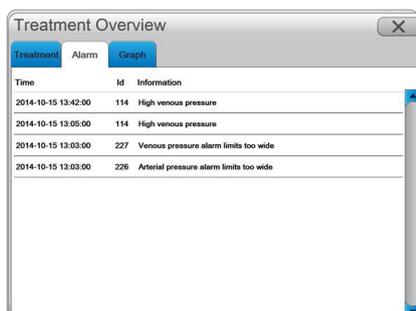
1. Remove the used BiCart and close the BiCart holder for 2 seconds.
2. Reopen the holder and install the new BiCart cartridge so the machine can automatically prime the new BiCart cartridge.

# AK 98 TROUBLESHOOTING

## Alarm Indication

There are two alarm levels: high priority alarms and medium priority alarms.

- **High Priority Alarm:** Flashing red light and repeating 5-tone sound. The light will continue to flash and audible tone will continue to sound until the cause of the alarm is resolved.
- **Medium Priority Alarm:** Flashing yellow light and repeating 3-tone sound. The light will continue to flash and audible tone will continue to sound until the cause of the alarm is resolved.



Time	Id	Information
2014-10-15 13:42:00	114	High venous pressure
2014-10-15 13:05:00	114	High venous pressure
2014-10-15 13:03:00	227	Venous pressure alarm limits too wide
2014-10-15 13:03:00	226	Arterial pressure alarm limits too wide

The time of the alarm will appear in the alarm history. Once the machine is powered down, the alarm list will be cleared. The alarm list will be maintained during a power outage as long as the backup battery allows. The last alarm that occurred will be displayed at the very top of the list. When the list is full, the oldest data will be cleared.

### How to Check the Alarm List

1. Press the History button.
2. Select the Alarm tab.

## How to Pause Treatment

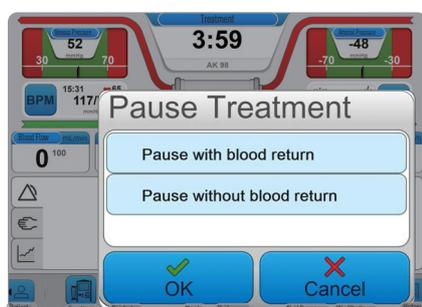
**It is possible to pause the treatment and disconnect the patient during treatment. If the treatment is paused:**

- Blood will circulate at a lower blood flow rate.
- Monitoring and alarms are still active, but the alarm windows for arterial and venous pressures are widened.
- The paused timer will appear on the screen and an alarm will sound every 15 minutes.
- Isolated UF, profiling, and Diascan are deactivated.
- Continuous heparin administration is deactivated, but you may still use bolus dose.
- Automatic BPM is deactivated, but you may still take BPM manually.
- When treatment resumes, the treatment continues and completes according to the initial settings.

### How to Pause Treatment

1. Press Functions.
2. Select Pause Treatment.
3. Confirm Pause treatment with blood return when the blood pump stops.
4. Prepare for rinse back using the rinse back line on the arterial infusion line.
5. Start blood pump.
6. Stop blood pump when ready for pause treatment.
7. Select Pause treatment.
8. Disconnect patient and connect blood lines for recirculation with sterile recirculation connector.
9. Start blood pump – the time in pause treatment is now being displayed on the screen.
10. Stop blood pump when ready to resume treatment.
11. Reconnect patient and confirm when patient is connected.
12. Start blood pump.
13. Increase blood flow.
14. Start Ultrafiltration and now the treatment will continue from where it was stopped.

**Note:** It is possible to pause without blood return. Follow the on-screen instructions.



# AK 98 TROUBLESHOOTING

## What to Do During a Power Outage

### Using the Machine During a Power Outage

- If the machine loses power, a backup battery will temporarily power the blood unit. All settings and actual values will be saved.
- The blood pump and heparin pump will continue to operate using battery power, but dialysate preparation will stop. The machine will enter bypass mode.
- The backup battery will work for a limited time. A fully charged battery in good condition will last at least 30 minutes.
- If the power outage is expected to last for more than a few minutes, consider discontinuing the treatment.

### Continuing Treatment After a Power Outage

- When power is restored, the machine turns on automatically and asks the user to confirm the restart.
- The treatment will resume from where it left off, and all settings and actual values will be saved. However, the user must double check all treatment settings.

## Manual Rinseback

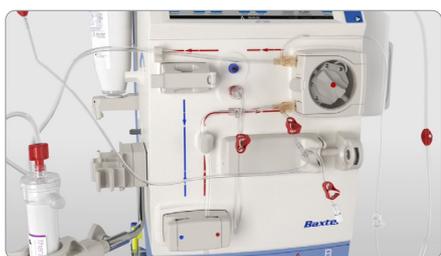
### Manual Rinseback Process

 **Note:** During manual procedure to return blood to patient during a power failure, the operator shall take full responsibility for visually monitoring all safety parameters that cannot be monitored by the machine during a power failure (for example, air detection).

- If the blood pump cannot be started, the user may manually rinseback blood to the patient.
  - Since the alarm will not play while the machine is turned off, you must consider the risks that may occur during manual rinseback.
1. Close the arterial blood line and patient access clamps.
  2. Disconnect the arterial blood line from the patient.
  3. Connect the arterial blood line to the rinseback line, and open all clamps on the arterial blood line, rinseback line, and infusion line.
  4. Remove venous line from venous line clamp.
  5. Open the blood pump door.
  6. Rotate the blood pump counter-clockwise to return the blood. Check that no air enters the patient.
  7. Once rinseback is completed, clamp the venous blood line and patient access clamps.
  8. Disconnect the venous blood line from the patient.

# AK 98 TROUBLESHOOTING

## Changing a Wet Transducer



1. Wear PPE as per facility policy.
2. Reduce blood flow.
3. Clamp transducer line.
4. Remove wet transducer protector from connector on machine and inspect for blood or priming solution strike-through.
5. Carefully inspect transducer connector on **AK 98** for fluid. If signs of fluid strike-through, machine should be pulled after completion of treatment and an authorized service technician must replace the appropriate components in the machine.
6. Remove wet transducer protector from line and discard per facility policy.
7. Attach a 10 mL syringe to the transducer line and unclamp the line. To purge the transducer line of fluid, slowly inject 2 mL of air into the line up until the T junction and re-clamp the transducer line.
  - ≡ **Note:** Do NOT inject air beyond the T junction on the transducer line.
  - ≡ **Note:** If changing the venous transducer protector, slowly inject 2 mL of air into the line to the venous chamber.
8. Attach new transducer protector to pressure transducer line. Ensure secure connection between transducer protector and line.
9. Attach transducer protector to **AK 98**, ensuring a secure connection between transducer protector and machine.
10. Unclamp the transducer line and resume previous blood flow setting.
11. Verify arterial / venous pressure monitoring.

# AK 98 TROUBLESHOOTING

**Note:** The time the blood pump is stopped may contribute to additional clotting. It is important to check the bloodlines and dialyzer for clotting after the blood pump stops and therapy is restarted.

Code	Machine Screen Guidance	Resolution
100	<p><b>Air in Venous Drip Chamber</b> Press Timer button, then turn the knob to increase drip chamber level.</p> 	<ul style="list-style-type: none"> <li>• If level has dropped or foam is present in the chamber, touch the clock symbol on the screen.</li> <li>• Attempt to resolve by SLOWLY increasing the level in the venous chamber using the level adjustment knob, ensure that the blood pump is moving.</li> <li>• Be sure to watch for the message “Air no longer detected” and confirm on the screen if appropriate.             <ol style="list-style-type: none"> <li>1. Press the timer button that appears on the alert tab to turn on the blood pump. At this point, the blood pump will rotate slowly at 50 mL/min and the speed cannot be changed.</li> <li>2. Simultaneously rotate the chamber level adjustment knob counter-clockwise to raise the blood level.</li> </ol> </li> <li>• May require multiple attempts depending on the amount of air present.</li> <li>• May indicate clotting in the venous chamber. Be sure to visually inspect the chamber for signs of clotting.</li> </ul>
101	<p><b>Blood Detected in Dialysate Path</b> To start blood pump for 15 sec to rinse detector, press Timer button.</p>	<ul style="list-style-type: none"> <li>• Indicates that a blood leak may have occurred during treatment.</li> <li>• May occur immediately following priming of a new BiCart cartridge.</li> <li>• Follow your facility specific policy when a blood leak alarm occurs during patient treatment.</li> </ul>
102	<p><b>Blood is Detected During Functional Check</b> Blood in priming detector. Functional check is stopped.</p>	<ul style="list-style-type: none"> <li>• Consider powering the machine down by pressing and holding the on/off button located on the operator panel to the right of the screen.</li> <li>• While power is off, ensure that the prime sensor has been cleaned with isopropyl alcohol and allowed to dry.</li> <li>• Power the machine on and allow it to go through Functional Check.</li> <li>• Repeat cleaning if necessary. If alarm continues to recur, call Technical Services.</li> </ul>
107	<p><b>Blood Pump is Stopped too Long</b></p>	<ul style="list-style-type: none"> <li>• Prompts the user to restart the blood pump when it has not been restarted in 180 seconds.</li> <li>• Manually start the blood pump using the blood pump button to the right of the screen.</li> <li>• If another alarm has caused the stoppage, resolve the primary alarm so the blood pump can start.</li> <li>• This may require going back to messaging under the flashing hand.</li> </ul>
108	<p><b>Dialysate Path Obstruction</b> Too high blood circuit pressure. Check circuit, start blood pump.</p>	<ul style="list-style-type: none"> <li>• Do not hand crank the blood pump to resolve alarm situation.</li> <li>• Consider checking the drain line to ensure it is not obstructed.</li> <li>• Ensure there are no kinks or clamps on the blood lines.</li> <li>• May indicate clotting in the blood circuit. Consider assessing the blood set/patient access for signs of clotting.</li> </ul>

# AK 98 TROUBLESHOOTING

Code	Machine Screen Guidance	Resolution
109	<b>High Arterial Pressure</b>	<ul style="list-style-type: none"> <li>This may be a secondary alarm, resulting from a stop of the blood pump.</li> <li>Ensure there are no kinks or clamps closed on the blood tubing.</li> <li>Consider opening (widening) the Arterial Pressure window on the screen and using the green or red arrows to get the grey dial into the green area of the pressure limits so that the pump can restart.</li> <li>Check the transducer protector for potential strikethrough, if blood has contacted the protector membrane – replace with a sterile transducer protector if necessary.</li> <li>Consider needle dislodgement, check connection of arterial needle with arterial line.</li> </ul>
114	<b>High Venous Pressure</b>	<ul style="list-style-type: none"> <li>Consider lowering the pump speed while the pump is stopped using the blood pump down button (-) to the right of the screen.</li> <li>Alarm recurrence may indicate a mechanical obstruction – access complications, kinks, or poor flow within vascular access related to the set pump speed.</li> <li>May also indicate clotting in the venous chamber.</li> <li>Check the transducer protector for potential strikethrough, if blood has contacted the protector membrane – replace with a sterile transducer protector if necessary.</li> </ul>
115	<b>Low Arterial Pressure</b>	<ul style="list-style-type: none"> <li>Consider lowering the pump speed while the pump is stopped using the blood pump down button (-) to the right of the screen.</li> <li>May indicate a mechanical obstruction - access patency issues, kinks, or poor flow within vascular access related to the set pump speed.</li> </ul>
120	<b>Low Venous Pressure</b> Check the venous needle position or catheter lumen.	<ul style="list-style-type: none"> <li>Consider needle dislodgement, potential clotting before the dialyzer, or a wet transducer protector.</li> </ul>
123	<b>Technical Error</b> The machine has been automatically restarted. To continue press Confirm.	<ul style="list-style-type: none"> <li>Press the Confirm key on the screen to continue treatment.</li> <li>Proceed to the Functions key, Service, and then to the Error List tab at the top of the screen. Note the error code on the Error List (most recent at the top).</li> <li>If the alarm recurs, contact Technical Services and provide the full error code. <b>AK 98</b> is continuously supervising the computers used to run treatment. If the system identifies a problem, it will generate an automatic restart to restore a fully operational system.</li> </ul>
124	<b>Technical Error</b> Contact technical service.	<ul style="list-style-type: none"> <li>Most commonly occurs during the Functional Check.</li> <li>Consider powering the machine down by pressing and holding the on/off button located on the operator panel to the right of the screen. Note this is not possible during treatment.</li> <li>Ensure the dialysate connectors are properly seated on their dialysate ports.</li> <li>Check that there are no parts of the blood tubing strung on the machine before the blood pump button is flashing.</li> <li>Verify that the acid concentrate connector and BiCart arms are free of build-up.</li> <li>Power the machine on. If the alarm recurs, consider contacting Technical Services.</li> </ul>
203	<b>Heparin Pump is Overloaded</b> Check heparin line for obstruction.	<ul style="list-style-type: none"> <li>May be triggered by a closed clamp on the heparin infusion line or the heparin syringe is empty.</li> <li>Consider setting the heparin flow rate to 0 mL if the syringe is empty.</li> <li>If alarm recurs, consider removing the syringe from the pump and pulling the piston out to the right.</li> </ul>

# AK 98 TROUBLESHOOTING

Code	Machine Screen Guidance	Resolution
208	<p><b>Incorrect Dialysate Composition</b> Check set values and connected concentrates.</p>	<ul style="list-style-type: none"> <li>• Check that the acid jug container is filled or that the wall connection is secure.</li> <li>• Press the fluid key and go to the Cond tab; if the “Actual” conductivity doesn’t reach its set value, the machine may be unable to pull concentrates.</li> <li>• Verify that the red concentrate connector is free from build-up and that the blue O-rings are intact.</li> <li>• If needed, remove BiCart cartridge and shake to eliminate any clumping.</li> <li>• If the “Actual” conductivity number is not fluctuating after a few minutes, send the machine into a Rinse by selecting the Disinfect key, going to the Rinse tab, and selecting “Rinse” – reconnect the concentrates and monitor the conductivity.</li> <li>• If air is present in the acid line, wait – the air may need to be cleared from the acid line by the machine. The machine will not airlock.</li> </ul>
211	<p><b>Conductivity Out of Limits</b> When the dialysate conductivity is outside the set alarm limit.</p>	<ul style="list-style-type: none"> <li>• Check that the concentrate containers/BiCart cartridge are correctly connected, filled and not empty.</li> <li>• Check that there is not air or kinking in the concentrate wand and that wands are not sucking air.</li> <li>• Check that the BiCart cartridge has primed if the cartridge was dry when added to the machine – if not, consider removing, shaking to eliminate clumping, and reattaching to the arms.</li> </ul>
566	<p><b>Incorrect Conductivity</b> When the conductivity is not correct during a functional check.</p>	<ul style="list-style-type: none"> <li>• Reminder, when priming a BiCart cartridge during therapy, the BiCart arms must be closed for 2 seconds to initiate the priming process.</li> <li>• Check acid connector and BiCart arms for buildup and/or leaking.</li> <li>• Press fluid button and select Cond tab and see if the concentrate selected for the treatment is the same as the acid jug connected to the machine.</li> <li>• Wait until set conductivity is achieved.</li> </ul>
607	<p><b>Wrong Disinfectant</b> Check disinfectant. To continue press Confirm.</p>	<ul style="list-style-type: none"> <li>• Check that the correct concentration of disinfectant is connected to the machine – citric acid or bleach percentages.</li> <li>• Verify that the citric acid wand is below the level of the fluid in the jug.</li> <li>• If precipitate is found at the bottom of the citric acid jug, consider removing the wand and mixing the jug.</li> <li>• Consider that crystallization of the citric acid wand may have occurred, and the line may have to be purged with RO water.</li> <li>• Always follow the manufacturer’s instructions when reconstituting citric acid.</li> </ul>
538 - 543	<p><b>Dialysate Line Sensor Test</b> Remove and attach the dialysate lines from the dialysate ports to restart the test.</p>	<ul style="list-style-type: none"> <li>• May occur if five disinfection programs have been run in a row, without running function checks in between.</li> <li>• Remove the dialysate lines from the dialysate ports on the machine.</li> <li>• Ensure the lines are reseated properly.</li> <li>• Once reseated, the test will continue and message on screen will clear shortly.</li> </ul>
571	<p><b>Leakage Test Failed</b> Check dialysate lines. To continue press Confirm.</p>	<ul style="list-style-type: none"> <li>• Appears when the dialysate lines are not properly attached to the dialysate ports.</li> <li>• Check the dialysate lines are properly attached to the dialysate ports.</li> <li>• Confirm the attention.</li> </ul>

# ADVANCED FUNCTIONS OF AK 98

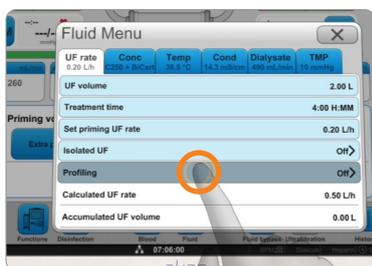
## Profiling

- **Profiling**

You can define the treatment parameter pattern through profiling. Ultrafiltration rate (UF rate), sodium ( $\text{Na}^+$ ) concentration, and bicarbonate ( $\text{HCO}_3^-$ ) concentration profiles can be used by the machine. You must confirm the profiling parameters prior to treatment.

- **Profiling Settings/Activation**

You may set up the profiling parameters immediately after the machine turns on and Function Check appears on the machine's status indicator. You may set up a model manually or select a preset model. You may set/adjust profiles for sodium ( $\text{Na}^+$ ) concentration, bicarbonate ( $\text{HCO}_3^-$ ) concentration, and UF rate for each model. The UF goal must be set up for treatment in order to use the ultrafiltration profile.



### Ultrafiltration Profiling

1. Press the Fluid button.
2. Select the UF rate tab.
3. Press Profiling.



4. Press UF rate.
5. Press Mode.
6. Select the graph method (linear, step, or interval). If the profile is step or interval, select the number of steps or intervals according to the prescription.
7. Press OK.
8. Select the Start value for the UF rate. The Stop value for the UF rate will be automatically calculated in relation to the starting value.
9. Press Activate.
10. Change or set the profiles for  $\text{Na}^+$  or  $\text{HCO}_3^-$ , if applicable.

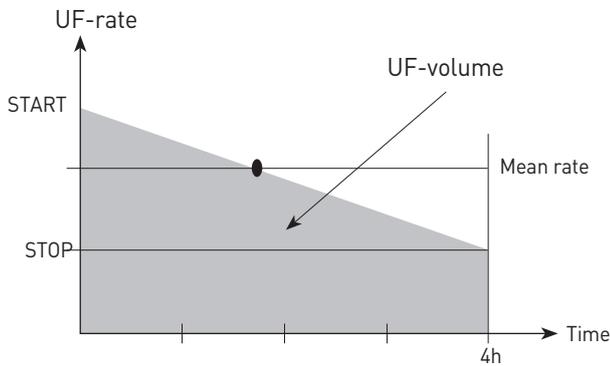


**Note:** You can create and use models by having an authorized technician preset the values for each profile.

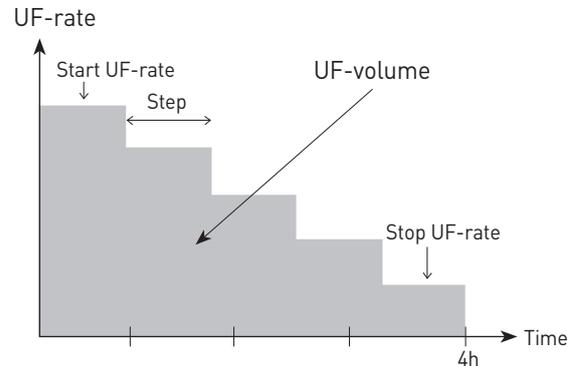
**Note:** If UF goal or treatment time changes during active UF profiling, the profile parameters will change automatically. Always check the UF profile settings if UF goal or treatment time changes when a UF profile is activated. If the profile parameters have not changed and UF profiling reactivates, the UF profiling graph will change automatically according to the remaining UF goal and treatment time. Always check the UF profile settings after deactivating and reactivating a UF profile.

# ADVANCED FUNCTIONS OF AK 98

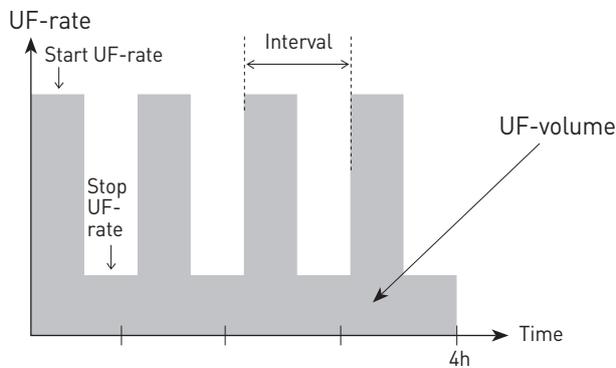
## Profiling



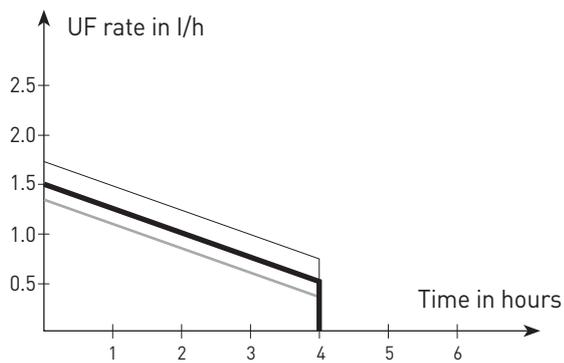
**Decreasing linear mode for UF rate profiling**



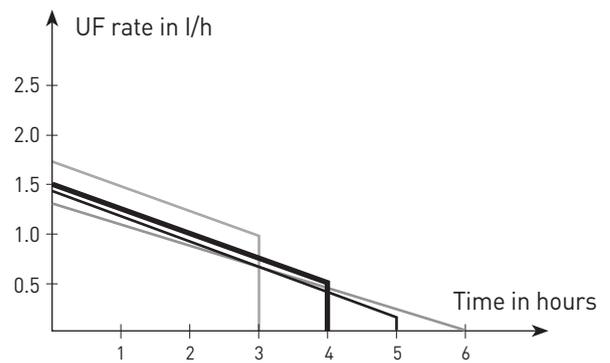
**Decreasing step mode for UF rate profiling**



**Interval mode for UF rate profiling**



**UF rate in linear mode when UF goal is changed**



**UF rate in linear mode when treatment time is changed**

# ADVANCED FUNCTIONS OF AK 98

## Profiling



### Sodium, Bicarbonate Profiling

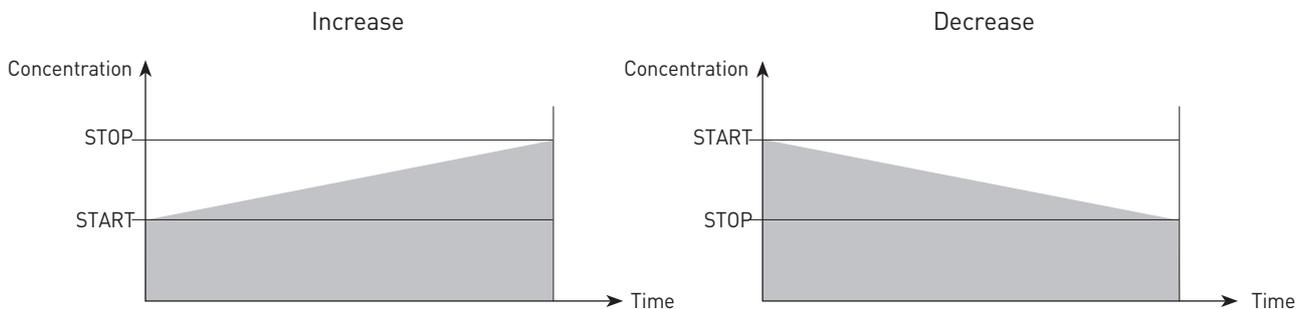
1. Press the Fluid button.
2. Select the UF rate tab or Cond tab.



3. Press Profiling and press Sodium ( $\text{Na}^+$ ) or Bicarbonate ( $\text{HCO}_3^-$ ) to set up profiling.
4. Set up the Start and Stop values.
5. Press Activate.

**Note:** You can create and use models by having an authorized technician preset the values for each profile.

The sodium ( $\text{Na}^+$ ) or bicarbonate ( $\text{HCO}_3^-$ ) profiles may consist of increasing or decreasing concentrations in the dialysate.



Example of linear graphs for sodium and bicarbonate profiles

**Note:** If the treatment time changes during sodium and/or bicarbonate profiling, the profiling graph will not change. Therefore, even if the treatment time decreases, it will not reach the preset stop value. If sodium or bicarbonate profiling is deactivated during treatment, the machine will continue to run using the values from the point when profiling stopped. If profiling is reactivated without a change to the profiling parameters, the machine will continue to run from the point when profiling was deactivated.

# ADVANCED FUNCTIONS OF AK 98

## Diascan

- **Diascan Function**

Diascan shows the clearance value and calculates whether the set Kt/V target and minimum values can be reached at the end of treatment.

- **Diascan Mechanism**

Since the molecular weights of urea and sodium are similar, the optional Diascan function enables non-invasive automatic monitoring of the sodium clearance rate, which is considered to be similar to the urea clearance rate.

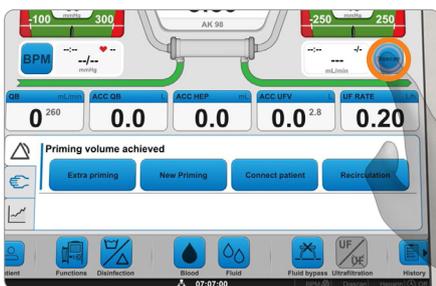
- **Kt/V Confirmation**

**AK 98** can calculate the Kt/V as a single measurement or at intervals. To measure Kt/V, the urea distribution volume must be set. The distribution volume is the urea distribution volume (water in the body) in liters and is estimated for each patient based on the patient's dry weight. The user sets the distribution volume on the machine.

**Note:** To get a reliable Kt/V value, enter the patient's distribution volume accurately into the machine. Because the Diascan measurement takes time, single measurements cannot be started with less than 30 minutes of treatment time remaining.

**Note:** The Diascan function can be programmed via the presets to be activated automatically.

**Note:** It is also possible to enter the patient parameters (Watson) after treatment has started so that the Kt/V calculation can be displayed.



1. Press the Diascan button.



2. If you know the patient's distribution volume, press Distribution volume (manual) in the Setup tab and set the volume. If you need to calculate the patient's distribution volume, select the Watson tab and press Enter Parameters.

3. Enter the patient's information in the settings that appear on the screen.

4. Select the Setup tab and press Interval.

**Note:** It is not necessary to activate the Alarm settings.

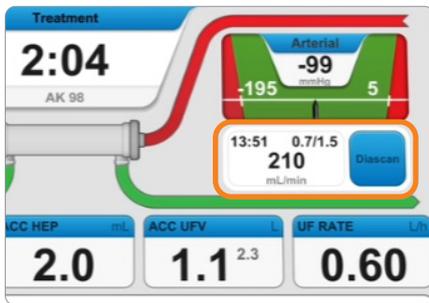


5. Select between 30 or 60 minute intervals to activate the Diascan function.

6. Press Single to take a single measurement.

# ADVANCED FUNCTIONS OF AK 98

## Diascan



### Results

The measurement results will appear in the clearance measurement output field.

- ① Time of Last Measurement
- ② Current/Estimated Kt/V at end of treatment
- ③ Last Measured Clearance Value



### Check Measurement History

1. Press the Diascan button.
2. Select the History tab and press History.



# ADVANCED FUNCTIONS OF AK 98

## Isolated UF (Ultrafiltration)

During isolated UF, diffusion does not occur. Because the dialysate bypasses the dialyzer, the machine only performs ultrafiltration. During isolated UF, because the dialysate bypasses the dialyzer, the blood cannot maintain its temperature in the same way it does during diffusion. Since the UF rate is usually high during isolated UF, a high blood flow rate, within acceptable limits for the patient, is recommended to prevent clotting in the dialyzer and blood line. When isolated UF is completed, the machine will automatically switch to the diffusion phase.



1. Set the treatment time and ultrafiltration goal for dialysis (diffusion step).
2. Press the Fluid button.



3. Press Isolated UF.
4. Press the Isolated UF volume button, and set the ultrafiltration goal for the isolated UF step.
5. Press the Isolated UF Time button, and set the time for the Isolated UF step.

**Note:** The values are added to the set diffusion values or, if the other preset is used, the values will be taken from the set time and UF goal values.



6. Press Activate.
7. Verify accuracy of total treatment time (time + Isolated UF time) and total UF goal (UF volume + Isolated UF volume). Make adjustments, as needed.

### How to add a second and subsequent phase of isolated UF

- Second and subsequent isolated UF phases may be activated at any point during treatment.
- The time and UF goal for the new phase must be added to the previous isolated UF time and UF goal to create a cumulative amount. For example, if the first phase was set to 30 minutes and 0.5 L, and the second phase to be set with the same values, the settings need to be 60 minutes and 1L, which is a total of two phases together.
- The values set for the second and subsequent phases must be greater than the accumulated isolated time and UF goal.
  - Note:** Isolated UF Deactivation: Press the Fluid button. Press Isolated UF, and deactivate isolated UF.
- To stop UF before the set isolated UF goals are met, deactivate Isolated UF and change the time and volume to values that have already been achieved (i.e., Isolated UF Accumulated Values).
- If only isolated UF is being performed, the remaining treatment time must also be set to zero to get the "Treatment time expired" message.
- If "Value out of range. The value can't be higher than 0.00 L" appears, first set the Total UF and then the Isolated UF goal.
  - Note:** The dialysate flow will not stop, as **AK 98** needs dialysate to measure ultrafiltration. It is not possible nor advisable to decrease dialysate flow rate or set it to zero.

# OTHER FUNCTIONS OF AK 98

## Concentrate Standby Mode (CSBM)

AK 98 can be placed into concentrate standby mode. In concentrate standby mode, the concentrate is no longer used, and water consumption can be reduced. Concentrate standby mode can be activated when the functional check is done and the flow diagram turns green. When concentrate standby mode is active, a message will appear in the information field. The bypass path of the flow diagram will turn orange. After 1 hour in concentrate standby mode, the machine will automatically start preparing dialysate again. If blood is detected, concentrate standby mode cannot be activated. Concentrate standby mode can be activated manually, or preset to activate automatically. Recirculation and concentrate standby mode cannot occur simultaneously.



### How to Activate Concentrate Standby Mode Manually

1. Press the Fluid button.

**Note:** The machine can be preset to automatically activate concentrate standby mode.



2. Select the Dialysate tab.
3. Activate concentrate standby mode.



### How to exit Concentrate Standby Mode

1. Select the Information tab.
2. Press Confirm the message.

**Note:** Do not stop the blood pump to connect patient until the dialysate line is green.

## Reactivate Concentrate Standby Mode (CSBM)



- CSBM will automatically deactivate after 1 hour.
- To reactivate CSBM press the Fluid key followed by the Dialysate tab and activate CSBM.
- Repeat every hour as needed.

# OTHER FUNCTIONS OF AK 98

## Service Menu



You may explore and adjust some machine settings, and check the error list.

1. Press the Functions button.

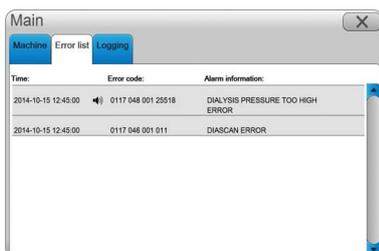


2. Press Service to open the menu.



There are 4 functions offered: Set time, Daylight Savings time, Screen brightness, and Volume.

- **Set Time:** Select Set Time, open the keypad, and adjust the time of the system clock.
- **Daylight Savings Time:** Press Activate to activate daylight savings time. When activated, the clock will advance by 1 hour (used in the summer months). When deactivated, the standard time will be shown on the clock (used in the winter months).
- **Screen Brightness:** Move the slider to adjust the screen's brightness.
- **Volume:** Move the slider to adjust the speaker volume.



### Error List

- **Time:** Shows the time when the error occurred.
- **Error Code:** The error code can identify the software or hardware component that caused the error.
- **Alarm (Error) Information:** Error messages that are displayed on the Error list tab. The most recent errors are shown at the top in black font. The list will be retained even if you turn off the machine or after a power outage.
  1. Press the Functions button.
  2. Press Service.
  3. Select the Error list tab.

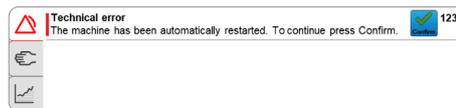
In the Logging tab, you can select the parameters that will be logged. This function is used by the authorized service technician to check the condition and status of hardware or software components.

# OTHER FUNCTIONS OF AK 98

## Automatic Restart

### What is the automatic restart?

The automatic restart is a recovery process of the **AK 98** program that usually completes in less than 1 minute. During this process, the screen turns off for ~10 seconds, the blood pump is stopped, and the **AK 98** machine is in a patient-safe state.



### After the automatic restart is completed, a notification is provided:

- If the restart happens during functional check, priming, or treatment:
    - The alarm “123 Technical error - The machine has been automatically restarted” is displayed, with red light and alarm sound
  - If the restart happens during disinfection:
    - The attention “586 Restarted after power failure” is displayed, with yellow light
- Note:** The automatic restart is logged in the error list as “HEARTBEAT ERROR - MACHINE RESTARTED”.
- The automatic restart may happen rarely and randomly, and it is important to report to clinical staff.
  - If the automatic restart occurs more than 3 times within a 30-day period, the **AK 98** machine will not allow treatment and the alarm “124 Technical error” will be displayed, with red light and alarm sound.

### Why may the automatic restart happen?

The **AK 98** program includes an internal safety process, called a “Heartbeat”, to check that there is healthy communication between the different electronic sub-systems inside the machine; whenever a malfunction is suspected, the **AK 98** system triggers an automatic restart.

**Note:** The term “Heartbeat” refers exclusively to a technical process intended to check correct functioning of internal electronics and is NOT related to any heart-related clinical parameter of the patient.

### How to manage the automatic restart during treatment?

1. Wait for the process to complete – do NOT press the Halt button on the back of the machine.
2. After the automatic restart is complete, press the Confirm button and check treatment parameters. The blood pump will restart automatically, and the **AK 98** machine will continue the treatment from where it was interrupted.
3. If the alarm “124 Technical error” is displayed, discontinue the treatment, and return the blood.

## Ultrafiltration (UF) Rate Limits



If the UF rate goes down to zero during treatment, due to alarm conditions, the machine will try to compensate for the time loss within the remaining time. A high UF rate limit is automatically calculated and set as 120% of the calculated UF rate. This limit is the allowable UF rate during treatment with the given remaining UF goal and treatment time.

The UF rate will go down to zero when:

- the UF is manually stopped
- the self-check is done every 30 minutes (UF taration)
- the blood pump is stopped
- the dialysate is in bypass
- the UF goal is achieved

**Note:** All actual values displayed are for a given moment in time and may therefore fluctuate.

# OTHER FUNCTIONS OF AK 98

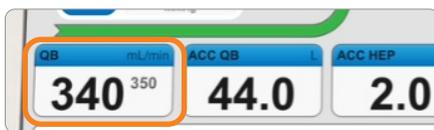
## Blood Pressure Measurement (BPM) Alarm Limit Setting



You may set upper and lower limits for alarms for the pulse, systolic, diastolic, and mean blood pressure. An alarm will occur when the value is outside the set alarm limits.

1. Press the BPM button.
2. Select the Alarm tab.
3. Press Set Limits.
4. After selecting the alarm limit that you wish to set, enter the alarm limit value.
5. Press OK.
6. Repeat Steps 4 and 5 for all alarm limits that you wish to set. Close the limit setup menu.
7. Press the Alarm Limit Activate button for the alarm limit to activate the new settings.

## Actual Blood Flow



The actual blood flow, also referred to as the compensated blood flow, is calculated from the blood pump rotations and the pump segment diameter and compensated with the pre-pump arterial pressure.

The actual blood flow is shown in large bold text in the QB treatment overview field, while the set blood flow rate is shown in small grey text.

# TIPS FOR USING AK 98

## Air Detector Activation

To avoid unnecessary air detector alarms during set up, wait to activate the air detector until all air has been removed from the circuit.

**Note:** The air detector is automatically activated when Connect patient is selected.

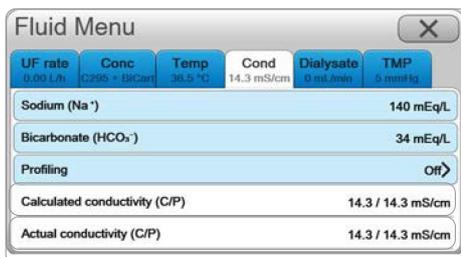


### The "Flashing" Attention Hand

- Alarms have higher priority than attention messages on the screen. This means that if an alarm occurs and cannot be resolved, discontinuing the treatment may only be possible by pressing the flashing attention hand on the screen.
- Once the flashing attention hand is selected, the "Confirm treatment time expired" message will be accessible.

**Note:** It may be necessary to repeat this sequence to complete the treatment discontinuation procedure.

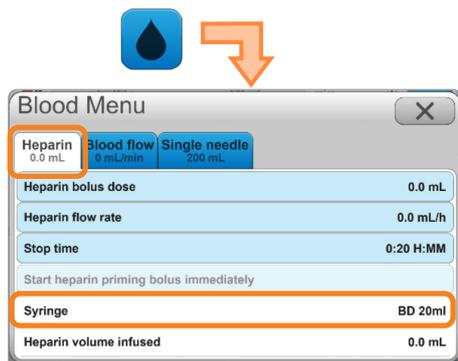
## Conductivity Actual and Calculated - C/P Values



- The actual value is the current value seen on the operator's panel.
- The calculated value is based on the type of concentrate selected and the set values for sodium and bicarbonate.

**Note:** If the two values do not match, the dialysate will automatically bypass the dialyzer.

## Heparin Delivery



### Tips to support accurate heparin delivery:

- Ensure the syringe used is the same as the brand and size programmed into the **AK 98** presets, or the heparin delivery may not be accurate.
- Confirm that heparin line is fully primed.
- To view the syringe brand and size, go to Blood Menu and select Heparin.

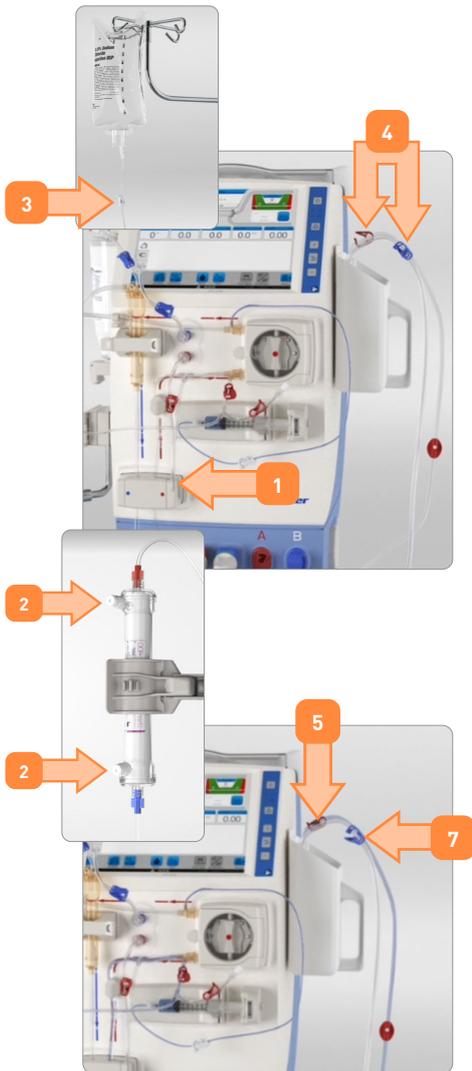
## Restart Using the On/Off Button



- If restarting using the On/Off button located on the operator's panel, to the right of the screen, ensure the dialysate lines are properly connected to the color-coded standby ports on the machine before restarting the **AK 98**. This will avoid unnecessary error messages.

# TIPS FOR USING AK 98

## Saline Loss



The arterial patient line is primed by gravity and is not counted in the preset prime volume.

*Example: If the priming volume is set to 300 ml, the remaining saline volume in a 1-liter saline bag after the complete prime procedure would be less than 700 ml.*

Tips to minimize saline loss during set up:

1. Verify the venous line is properly inserted in the venous clamp.
2. Ensure the caps are secured on the dialyzer dialysate ports.
3. Clamp the infusion line before spiking the saline bag.
4. Ensure the arterial bloodline clamp is open and venous clamp is closed when gravity priming of arterial line.
5. Clamp the arterial line as soon as saline has reached the prime bucket (some air may still be present).
6. Ensure priming via the blood pump occurs as soon as the arterial line is primed.
7. Unclamp the blue venous clamp before starting the blood pump.
8. Raise the venous chamber level during the initial prime cycle.
9. Connect arterial and venous lines for recirculation before selecting the Recirculation option.

**Note:** Wait to turn the dialyzer and stop the blood pump until the dialysate flow path turns green

## Surface Cleaning and Disinfection



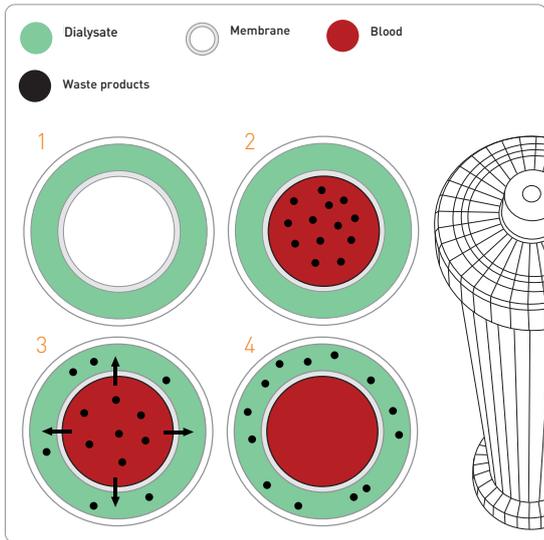
The exterior surfaces should be cleaned after treatment, using wipes moistened with ethanol (70%), isopropanol (60%), or sodium hypochlorite (1%).

**Note:** Highly wetted wipes may cause fluid to drip along sensitive components of the blood panel, like the priming detector highlighted on the picture. Residual detergent and/or film remaining on the priming detector may result in incorrect detection of blood, which could result in unnecessary alarms and interfere with the priming process.

- If hypochlorite is used after the allotted dry time, remove residual chemical / film by wiping with water.
- If highly wetted wipes are used, eliminate the excess fluid, and dry the priming detector after cleaning
- Hypochlorite (bleach) cleaning agent could leave a film on the priming detector; removal of the residual film using an isopropanol alcohol pad is recommended.

# HEMODIALYSIS BASICS

## How Hemodialysis Works



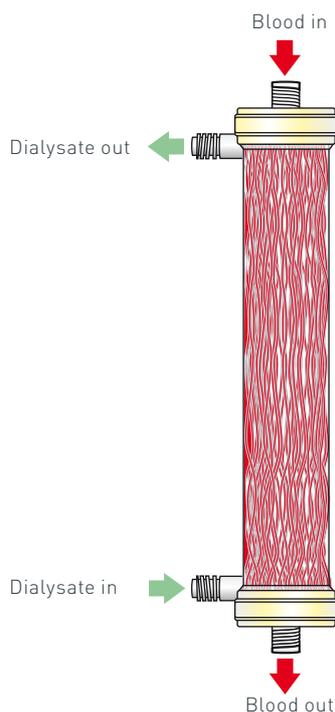
In hemodialysis, the cleaning of the blood takes place outside the body in an “artificial kidney”, also called a dialyzer. Blood is pumped via plastic lines to the dialyzer and back again, a process monitored and controlled by a dialysis machine.

During the treatment blood flows on one side of a membrane within the dialyzer. The dialysis machine mixes a fluid known as dialysate and passes it through the dialyzer on the other side of the membrane.

Waste products and excess fluid pass across the membrane from the blood into the dialysate fluid. The cleaned blood is returned to the body and the waste products and fluid are removed from the system.

As the dialysate is free from waste products, a concentration difference is created across the membrane. This makes the waste products move by diffusion from the blood, through the membrane and into the dialysate. When the treatment starts, besides waste products, the patient’s blood also contains excess fluid. To remove the fluid, a pressure gradient is applied across the membrane in the dialyzer. This forces water to leave the blood, and enter the dialysate by the process of ultrafiltration. The amount of fluid ultrafiltered during the entire treatment session should correspond to the excess volume.

## The Dialyzer



This is a small plastic cylinder which attaches to the disposable circuit.

A dialyzer contains many fibers of membrane.

This membrane is a thin film containing thousands of microscopic holes (pores). The pores allow water and waste products to pass through them but keep the blood cells and proteins within the blood.

Fluid is removed from the blood by ultrafiltration driven by a pressure gradient, TMP (transmembrane pressure), across the membrane.

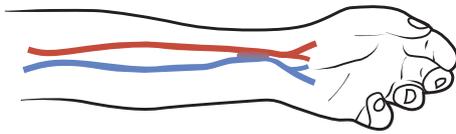
Dialysate passes continuously through the dialyzer on the other side of the membrane.

All dialyzers have four external ports, two that allow blood to enter and exit the dialyzer and two that allow dialysate to enter and exit the dialyzer.

The dialysate flows through the dialyzer in the opposite direction to the blood.

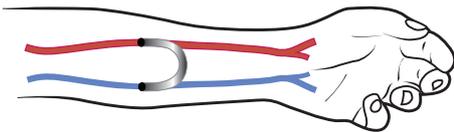
# HEMODIALYSIS BASICS

## Blood Access Types



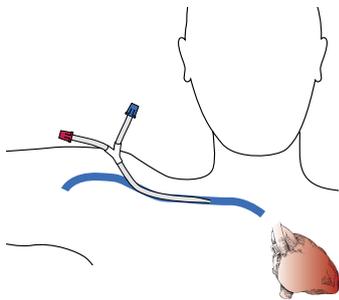
### AV-fistula

This is the most common type of access. The artery (red) has been connected to a superficial vein (blue), and after a maturation period the vein has become arterialized with thicker walls and larger diameter.



### Graft

The connection between artery and vein is made through a tube made either of an artificial material, or from part of one of your own blood vessels.



### Catheter

Usually inserted into a vein in the neck or shoulder.

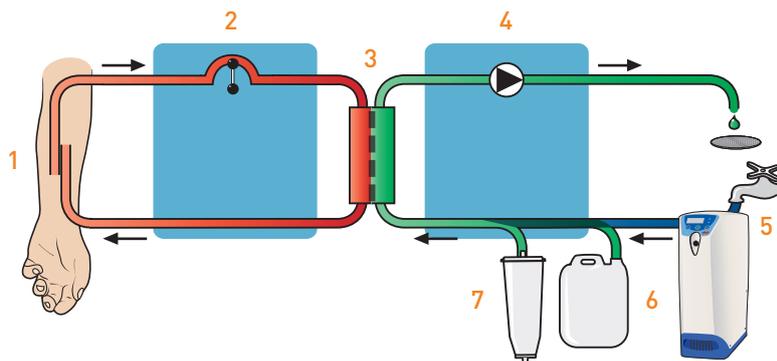
Typically, hemodialysis patients are administered heparin to reduce potential clotting during treatment.

**Note:** The time the blood pump is stopped during treatment should be minimized to reduce the risk of clotting.

## Different Components of the Hemodialysis System

A dialysis machine is needed to perform hemodialysis.

If the dialyzer is the kidney, the machine could be said to correspond to the rest of the body, providing the kidney with blood and controlling the whole process.



1. **The access:** the means by which blood is removed and returned to the body.
2. **The blood monitor:** pumps blood through a disposable circuit at a continuous, controlled speed from the access, through the dialyzer and back to the access.
3. **The dialyzer:** is connected within the disposable circuit. This is where waste products and excess fluid are removed from the blood.
4. **The fluid circuit:** prepares and pumps the dialysate through the dialyzer and out to drain.
5. **The reverse osmosis unit:** provides a continuous flow of clean water to the dialysis machine during treatment and disinfection.
6. **A-concentrate:** contains electrolytes, including sodium, potassium, calcium, magnesium chloride and acetic acid.
7. **B-concentrate:** contains the buffer bicarbonate and sodium.

# HEMODIALYSIS BASICS

## The Blood Monitor

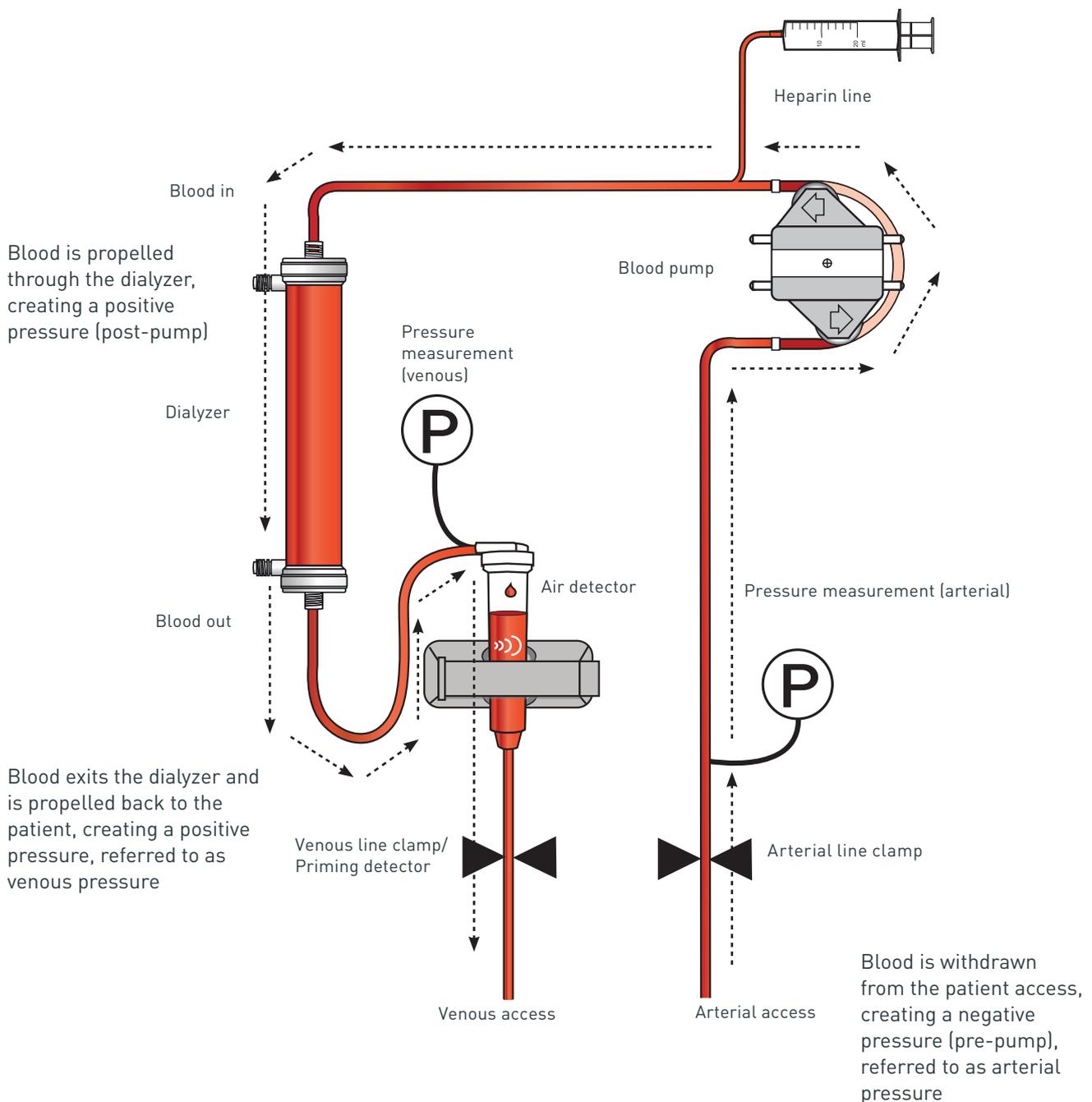
The blood monitor controls and supervises the entire blood circuit.

The purpose of the blood monitor is to pass blood from the access through the arterial blood line to the dialyzer, after which it is returned to you via the venous blood line. This is done at a continuous flow and controlled speed.

The blood pump is placed before the dialyzer.

Safety features built into the system monitor the pressure of the blood flow coming out of and being returned to the access.

An air detector is incorporated into the blood circuit in order to prevent possible air being returned to the access.



# HEMODIALYSIS BASICS

## The Fluid Monitor

The purpose of the fluid monitor is to prepare dialysate and continuously pass it through the dialyzer and out to drain.

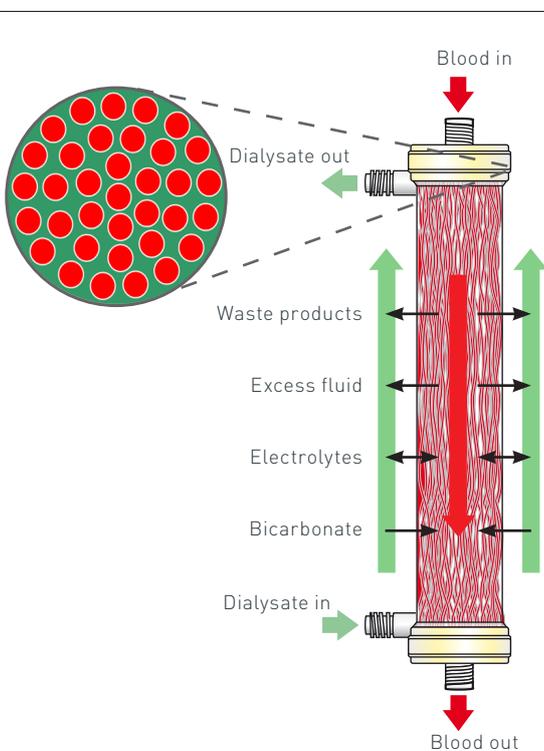
Water is taken into the machine and mixed with acid and bicarbonate concentrates.

The fluid is monitored to ensure the concentration of salts is correct. It is then warmed to body temperature and passed via the dialysate lines to the dialyzer.

The amount of fluid removed in the dialyzer is measured and controlled and the waste fluid is passed to the drain.

### The functions of the fluid unit are:

1. To produce dialysate in the correct concentration and at the right temperature
2. To pass the fluid through the dialyzer at a continuous controlled flow
3. To monitor and control fluid removal
4. To monitor the dialysate for problems



### The Dialysate

As well as removing waste products and fluid from the blood, the dialysate corrects the imbalance of various salts within the body.

This is achieved by adding these salts to the dialysate. The fluid monitor mixes water with concentrates taken from one or two canisters or cartridges. By varying the concentration of salts in the concentrate, the imbalance can be corrected (A and B concentrates).

Some solutes will move from the blood into the dialysate whilst others will move in the opposite direction.

# HEMODIALYSIS BASICS

## The Water Supply



**Note:** Image is representative of facilities that use a portable RO system.

The water used for dialysis must be of a high quality since the water is used to prepare dialysate.

A hemodialysis patient is exposed to several hundred liters of dialysate per week, which is separated from the blood only by a thin membrane.

The incoming water is therefore purified before it is used by the dialysis machine in a reverse osmosis (RO) unit. This device uses a semipermeable membrane that allows the passage of water but removes most other contaminants.

Pretreatment of the water may be required before it enters the RO unit.

- A water softener to remove hardness
- A carbon filter to remove chlorine and chloramines
- A sediment filter to remove particulate matter

The water should be analyzed on a regular basis, both from a chemical and microbiological standpoint, to ensure that it complies with relevant standards for dialysis water.

## Efficiency of Hemodialysis

### How do we know that the prescription and the treatment are adequate?

#### To accomplish a satisfactory dialysis treatment, four things have to be achieved:

1. Adequate removal of excess fluid
2. Adequate removal of unwanted solutes i.e., waste products
3. Correct electrolyte (salt) imbalances
4. Restore buffer (bicarbonate) balance

**Note:** The time the blood pump is stopped as well as the time the dialysate is bypassed will reduce the effective treatment time.

#### Removal of excess fluid

Accurate weight and assessment of fluid balance must be performed prior to initiating a treatment.

The fluid volume to be removed, the UF goal, is calculated from the weight gain since the last treatment, to which is added the volume of the drinks to be consumed during the session as well as any infusions.

The target weight is called dry weight. This is the weight a healthy person with a normal fluid regulation would have had.

When the UF goal is set, the machine can calculate the required UF rate by considering the treatment time, normally between 3 and 4 hours for conventional HD.

# HEMODIALYSIS BASICS

## Efficiency of Hemodialysis

### Solute removal

The removal of solutes is directly impacted by the prescribed blood flow ( $Q_b$ ).

One common waste is urea, which results from the breakdown of protein.

The simplest way to follow the urea removal is to analyze and compare the blood urea concentrations before (pre) and after (post) dialysis.

The results of the pre and post blood tests can be entered into one of two main calculations to establish efficient delivery of therapy.

### These calculations are

- Urea reduction ratio (URR)
- Urea kinetic modeling (Kt/V)

The URR measures the level of urea in the blood before and after a treatment. The difference between the two levels is shown as a percent.

The Kt/V is calculated by multiplying the amount of waste removed by the treatment time. The result is divided by the estimated volume of water in the body.

- The K stands for clearance of urea
- The t stands for treatment time
- The V stands for the volume of the body water

**Note:** The AK 98 dialysis machine has a feature integrated that can provide information on the efficiency of the treatment. The Diascan monitoring system can be used for theoretical clearance measurement (K) and (Kt/V).

**Note:** Clearance describes the cleansing capacity of a dialyzer.

Time	
Treatment time	4:00 H:MM
UF volume	0.00 L
Non diffusion time	0:00 H:MM
Passed treatment time	0:00 H:MM

Several factors facilitate the efficiency of a dialysis treatment. Those parameters can also be checked on the **AK 98** dialysis machine.

### The non-diffusion time:

This is the time during the treatment when no dialysis has occurred when the blood pump is stopped or when the dialysate is bypassed. This may be due to:

- An alarm that has put the dialysate in bypass (e.g., a conductivity alarm)
- An alarm that has stopped the blood pump (e.g., an arterial pressure alarm)

# HEMODIALYSIS BASICS

## Efficiency of Hemodialysis

ACC QB L  
**9.0**

**The Accumulated Blood Volume (ACC QB) is:**

**Blood flow (ml/minute) x Time (minutes)**

- To achieve an efficient solute removal the blood flow rate, QB, should be maintained per provider order, as dialysis access will allow.
- The length of the treatment is prescribed by a physician to achieve efficient solute and fluid removal appropriate for the individual patient.
- A stopped blood pump or reduced blood flow will also reduce the accumulated volume.

## RESOURCES

Scan the QR code



Visit the website to view **AK 98** resources and training videos.

[renalcareus.baxter.com/ak98](https://renalcareus.baxter.com/ak98)

## CONTACT US

For current product listing, visit [ecatalog.baxter.com](https://ecatalog.baxter.com) or contact your local Baxter sales representative at **1-888-736-2543**.

For Technical Support, call **1-800-525-2623 Option #2** or email [COtechsupport@baxter.com](mailto:COtechsupport@baxter.com).

For Medical Information, call **1-888-736-2543 Option #2** or email [MedInfo@baxter.com](mailto:MedInfo@baxter.com).

For Customer Service, call **1-888-229-0001** for products or **1-800-525-2623 Option #1** for spare parts.



**Rx Only.** For safe and proper use of the products mentioned herein, please refer to the appropriate Instructions for Use or Operator's Manual.

The Baxter **AK 98** dialysis machine is intended to be used for intermittent hemodialysis and/or isolated ultrafiltration treatments of patients with chronic or acute renal failure or fluid overload upon prescription by a physician.

The **AK 98** dialysis machine is indicated to be used on patients with a body weight of 25 kg or more. The **AK 98** dialysis machine is intended to be used by trained operators when prescribed by a physician, in a chronic care dialysis or hospital care environment.

The Baxter **AK 98** dialysis machine is not intended for Selfcare or Home use.

Baxter and AK 98 are trademarks of Baxter International Inc.  
All other trademarks mentioned herein are the properties of their respective owners.

**Baxter**

Baxter Healthcare Corporation  
One Baxter Parkway, Deerfield, IL 60015 USA  
[renalcareus.baxter.com](https://renalcareus.baxter.com)  
Tel +1 (800) 422-9837

US-RC4-220021 v1.0 02/23